NEW ZEALAND

EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

AS-NZS 2845-1 (2010) (English): Water supply - Backflow prevention devices - Materials, design and performance requirements [By Authority of The Guidelines of South East Water, City West Water, and Yara Valley Water]

We will sell to no man,
we will not deny or defer to any man either justice or right.
Magna Carta—Tūtohinga Nui
Kore rawa e hoko ki te tangata, e kore e whakakāhoretia,
e tautuku rānei te tangata ki te ture, tika ranei.

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

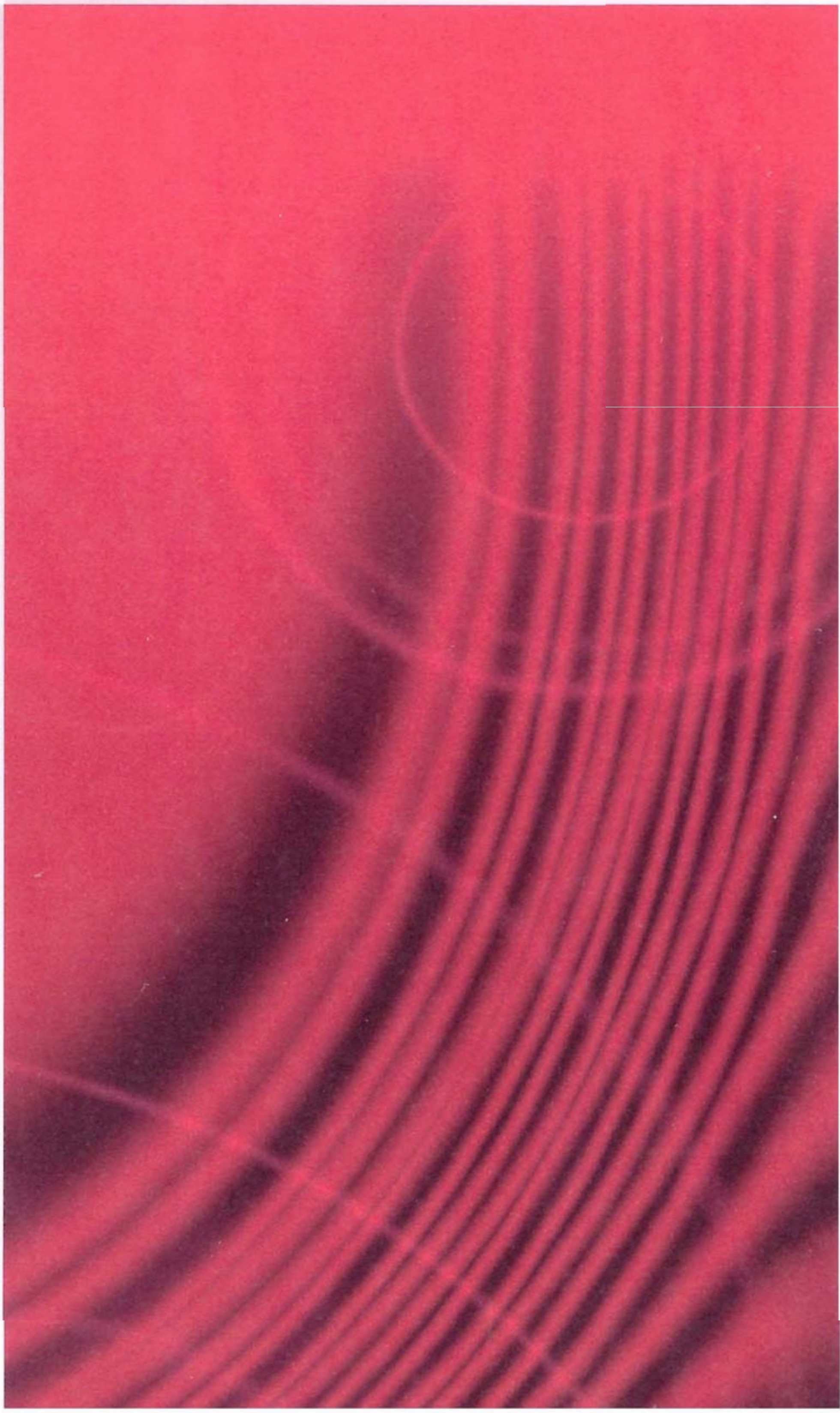
PROTECTED BY COPYRIGHT

AS/NZS 2845.1:2010

STANDARDS
NEW ZEALAND
PAEREWA AOTEAROA

Water supply—Backflow prevention devices

Part 1: Materials, design and performance requirements



STANDARDS
Australia

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS-023, Backflow Prevention Devices for Water Supply. It was approved on behalf of the Council of Standards Australia on 24 May 2010 and on behalf of the Council of Standards New Zealand on 28 May 2010.
This Standard was published on 30 June 2010.

The following are represented on Committee WS-023:

ACT Planning and Land Authority
Australian Industry Group
Master Plumbers Association of NSW
Master Plumbers, Gasfitters and Drainlayers New Zealand
Plastics Industry Pipe Association of Australia
Plumbing Products Industry Group
Queensland Brassware Industry Advisory Panel
South Australian Water Corporation
Sydney Water Corporation
Water New Zealand
Water Services Association of Australia

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 10003.

AS/NZS 2845.1:2010

Australian/New Zealand Standard™

Water supply—Backflow prevention devices

Part 1: Materials, design and performance requirements

Originated as AS 2845—1986.
AS 2845—1986 revised and redesignated AS 2845.1—1991.
Second edition 1995.
AS 2845.1—1995 jointly revised and redesignated AS/NZS 2845.1:1998.
Second edition 2010.

COPYRIGHT

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6140

ISBN 978 0 7337 9632 6

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-0023, Backflow Prevention Devices for Water Supply, to supersede AS/NZS 2845.1:1998.

The objective of this Standard is to provide health and safety and protection of the environment by providing suitable devices that qualify with established type testing.

This Standard does not include all types of backflow prevention devices currently on the market. It includes only those which at the time of publication were considered to be most relevant to the protection of drinking water supplies.

This revision includes amendments and requirements for additional devices arising from industry requirements.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Illustrations used in this Standard are diagrammatic only and have been chosen without prejudice.

CONTENTS

Page

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE 9
1.2 APPLICATION 9
1.3 NORMATIVE REFERENCES 10
1.4 DEFINITIONS 10
1.5 TESTING APPARATUS, TESTING SEQUENCE AND INSTRUMENTATION 11
1.6 DESIGNATION OF SIZE 11
1.7 CLASSIFICATION 12
1.8 ALLOWABLE PRESSURES AND FLOW VELOCITIES 12

SECTION 2 MATERIALS

2.1 GENERAL 13
2.2 STAINLESS STEEL 13
2.3 FILLER METALS 13
2.4 NICKEL-COPPER-IRON 13
2.5 FERROUS MATERIALS 14
2.6 COPPER 14
2.7 COPPER ALLOYS 14
2.8 ALUMINIUM ALLOYS 14
2.9 CORROSION-RESISTANT METALLIC MATERIALS 14
2.10 ELASTOMERIC MATERIALS 15
2.11 PLASTICS 15

SECTION 3 COMMON DESIGN AND PERFORMANCE REQUIREMENTS

3.1 GENERAL 16
3.2 EFFECT ON WATER 16
3.3 PRESSURE AND TEMPERATURE RANGES 16
3.4 DESIGN 16
3.5 END CONNECTIONS 17
3.6 VALVE SEATINGS 17
3.7 STRUCTURAL TESTS 17
3.8 SAMPLING AND FREQUENCY PLANS 18

SECTION 4 ATMOSPHERIC VACUUM BREAKER (AVB)

4.1 GENERAL 19
4.2 APPLICATION 19
4.3 COMPONENTS 19
4.4 SPECIFIC DESIGN REQUIREMENTS 19
4.5 PERFORMANCE TESTS 20
4.6 SAMPLING AND FREQUENCY PLANS 21

SECTION 5 HOSE CONNECTION VACUUM BREAKER (HCVB)

5.1 GENERAL 22
5.2 APPLICATION 22
5.3 COMPONENTS 22
5.4 SPECIFIC DESIGN REQUIREMENTS 22
5.5 PERFORMANCE TESTS 23
5.6 SAMPLING AND FREQUENCY PLANS 24

Page

SECTION 6 DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

6.1 GENERAL 25
6.2 APPLICATION 25
6.3 COMPONENTS 25
6.4 SPECIFIC DESIGN REQUIREMENTS 25
6.5 PERFORMANCE TESTS 26
6.6 SAMPLING AND FREQUENCY PLANS 27

SECTION 7 DUAL CHECK VALVE (DUAL CV)

7.1 GENERAL 28
7.2 APPLICATION 28
7.3 COMPONENTS 28
7.4 PERFORMANCE TESTS 28
7.5 SAMPLING AND FREQUENCY PLANS 29

SECTION 8 DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

8.1 GENERAL 30
8.2 APPLICATION 30
8.3 COMPONENTS 30
8.4 SPECIFIC DESIGN REQUIREMENTS 30
8.5 PERFORMANCE TESTS 31
8.6 SAMPLING AND FREQUENCY PLANS 31

SECTION 9 PRESSURE TYPE VACUUM BREAKER (PVB)

9.1 GENERAL 32
9.2 APPLICATION 32
9.3 COMPONENTS 32
9.4 SPECIFIC DESIGN REQUIREMENTS 33
9.5 PERFORMANCE TESTS 33
9.6 SAMPLING AND FREQUENCY PLANS 34

SECTION 10 DOUBLE CHECK VALVE (DCV)

10.1 GENERAL 35
10.2 APPLICATION 35
10.3 COMPONENTS 35
10.4 SPECIFIC DESIGN REQUIREMENTS 35
10.5 PERFORMANCE TESTS 35
10.6 SAMPLING AND FREQUENCY PLANS 36

SECTION 11 DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

11.1 GENERAL 37
11.2 APPLICATION 37
11.3 COMPONENTS 37
11.4 PERFORMANCE TEST 37
11.5 SAMPLING AND FREQUENCY PLANS 38

SECTION 12 REDUCED PRESSURE ZONE DEVICE (RPZD)

12.1 GENERAL 39
12.2 APPLICATION 39
12.3 COMPONENTS 39
12.4 SPECIFIC DESIGN REQUIREMENTS 40
12.5 PERFORMANCE TESTS 40
12.6 SAMPLING AND FREQUENCY PLANS 42

Page

SECTION 13 REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

13.1 GENERAL ... 43
13.2 APPLICATION ... 43
13.3 COMPONENTS ... 43
13.4 PERFORMANCE TEST ... 43
13.5 SAMPLING AND FREQUENCY PLANS ... 44

SECTION 14 SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

14.1 GENERAL ... 45
14.2 APPLICATION ... 45
14.3 COMPONENTS ... 45
14.4 SPECIFIC DESIGN REQUIREMENTS ... 46
14.5 PERFORMANCE TESTS ... 46
14.6 SAMPLING AND FREQUENCY PLANS ... 47

SECTION 15 BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

15.1 GENERAL ... 48
15.2 APPLICATION ... 48
15.3 COMPONENTS ... 48
15.4 SPECIFIC DESIGN REQUIREMENTS ... 49
15.5 PERFORMANCE TESTS ... 49
15.6 SAMPLING AND FREQUENCY PLANS ... 50

SECTION 16 PIPE INTERRUPTER DEVICE (PID)

16.1 GENERAL ... 51
16.2 APPLICATION ... 51
16.3 COMPONENTS—AIR INLETS ... 51
16.4 SPECIFIC DESIGN REQUIREMENTS ... 51
16.5 PERFORMANCE TEST ... 52
16.6 SAMPLING AND FREQUENCY PLANS ... 52

SECTION 17 SINGLE CHECK VALVE (TESTABLE) (SCVT)

17.1 GENERAL ... 53
17.2 APPLICATION ... 53
17.3 COMPONENTS ... 53
17.4 SPECIFIC DESIGN REQUIREMENTS ... 53
17.5 PERFORMANCE TESTS ... 53
17.6 SAMPLING AND FREQUENCY PLANS ... 54

SECTION 18 SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)

18.1 GENERAL ... 55
18.2 APPLICATION ... 55
18.3 COMPONENTS ... 55
18.4 PERFORMANCE TESTS ... 56
18.5 SAMPLING AND FREQUENCY PLANS ... 56

SECTION 19 MARKING AND PACKAGING

19.1 MARKING ... 57
19.2 PACKAGING ... 57

Page

SECTION 20 MANUFACTURER'S DATA
20.1 INSTALLATION INSTRUCTIONS 58
20.2 MAINTENANCE INSTRUCTIONS 58

APPENDICES
A MEANS FOR DEMONSTRATING COMPLIANCE WITH THIS STANDARD 59
B NORMATIVE DOCUMENTS 83
C TESTING APPARATUS, TEST SEQUENCE AND INSTRUMENTATION REQUIREMENTS 85
D TORQUE TEST ON SCREWED-IN END DEVICES 91
E TEST FOR ABILITY TO WITHSTAND CONTINUOUS PRESSURE—DEVICES INTENDED FOR HEATED WATER APPLICATIONS 93
F POSITIVE PRESSURE TEST 94
G REVERSE PRESSURE TEST 95
H AIR PORT OPENING AREA TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB) , SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB), AND PIPE INTERUPTER DEVICE (PID) 97
I WATER RISE TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) 99
J ENDURANCE TEST—ATMOSPHERIC VACUUM BREAKER (AVB) 101
K RATED FLOW AND PRESSURE LOSS TEST 103
L VENTILATION VALVE LEAKAGE TEST—ATMOSPHERIC VACUUM BREAKER (AVB) 104
M DETERMINATION OF CRITICAL LEVEL—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) 105
N TEST FOR LEAKAGE FROM AIR PORTS—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV) 107
O TEST FOR RESISTANCE TO BENDING—HOSE CONNECTION VACUUM BREAKER (HCVB) 108
P TEST FOR RESISTANCE AND RELIEF OF BACKPRESSURE—HOSE CONNECTION VACUUM BREAKER (HCVB) 109
Q BACKPRESSURE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB) 110
R TEST FOR BACK-SIPHONAGE—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) 111
S TEST FOR RATED WATER FLOW CAPACITY AND PRESSURE LOSS—HOSE CONNECTION VACUUM BREAKER (HCVB) 112
T ENDURANCE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB) 113
U NON-RETURN VALVE CLOSING PRESSURE TEST 114
V TEST FOR LEAKAGE FROM AIR PORTS—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC) 116
W TEST FOR BACKFLOW THROUGH UPSTREAM NON-RETURN VALVE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC) 117

Page

X VENTILATION VALVE OPENING PRESSURE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC) 119
Y TEST FOR BACK-SIPHONAGE UNDER BACKPRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) 120
Z TESTING INSTALLATION FOR TESTS OF APPENDICES E, F, K, L, M, S AND AA 121
AA TEST FOR FLOW RATE AT LOW SUPPLY PRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) 122
BB ENDURANCE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) 123
CC ENDURANCE TEST—DOUBLE CHECK VALVE (DCA), DUAL CHECK VALVE (Dual CV), DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV), DOUBLE CHECK DETECTOR ASSEMBLY (DCDA), SINGLE CHECK VALVE (TESTABLE) (SCVT) AND SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT) 124
DD BACK-SIPHONAGE TEST—DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV) 126
EE VENTILATION VALVE OPENING PRESSURE TEST—PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) 128
FF ENDURANCE TEST—PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) 130
GG INTERMEDIATE CHAMBER PRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD)AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 131
HH DETERMINATION OF SUPPLY PRESSURE AT WHICH PRESSURE IN THE INTERMEDIATE CHAMBER BECOMES ATMOSPHERIC—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 133
II DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS 14 kPa OR GREATER—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 135
JJ DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS LESS THAN 14 kPa—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 137
KK DETERMINATION OF PRESSURE DIFFERENTIAL AT WHICH RELIEF VALVE COMMENCES TO OPEN—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 139
LL TEST FOR EFFECT OF SUPPLY PRESSURE FLUCTUATION ON DISCHARGE FROM RELIEF VALVE—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 141
MM BACK-SIPHONAGE TEST—REDUCED PRESSURE ZONE DEVICE RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 142
NN BACKPRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 144
OO ENDURANCE TEST—REDUCED PRESSURE ZONE DEVIÇE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPZA) 146

Page

PP STICTION TEST—RESILIENT SEAT MATERIAL ... 147
QQ AIR PORT ENTRY SEALING TEST—SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) ... 150
RR BACK-SIPHONAGE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC) ... 152
SS ENDURANCE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC) ... 154
TT REQUIREMENTS SPECIFIC TO PLASTICS MATERIALS FOR DEVICE BODIES ... 155

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Water supply—Backflow prevention devices

Part 1: Materials, design and performance requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the materials, design, performance and testing of mechanical backflow prevention devices that are used for the protection of water supplies.

This Standard covers backflow prevention devices classified as PN 10, PN 12 or PN 16, of the following types:

(a) Atmospheric vacuum breaker (AVB).

(b) Hose connection vacuum breaker (HCVB).

(c) Dual check valve with atmospheric port (DCAP).

(d) Dual check valve (Dual CV).

(e) Dual check valve with intermediate vent (Du CV).

(f) Pressure-type vacuum breaker (PVB).

(g) Double check valve (DCV).

(h) Double check detector assembly (DCDA).

(i) Reduced pressure zone device (RPZD).

(j) Reduced pressure detector assembly (RPDA).

(k) Spill-resistant pressure vacuum breaker (SPVB).

(l) Beverage dispenser dual check valve with atmospheric port (BDDC).

(m) Pipe interrupter device (PID).

(n) Single check valve (testable) (SCVT).

(o) Single check detector assembly testable (SCDAT).

NOTE: Unless otherwise specified, the nominal size of a device is determined by the inlet connection.

1.2 APPLICATION

The means for demonstrating compliance with this Standard for the purposes of the Watermark Certification Scheme shall be in accordance with Appendix A.

All backflow prevention devices shall comply with Sections 1 to 3, and 19. Each backflow prevention device type shall comply with the relevant Section as follows:

Section 4	Atmospheric vacuum breaker (AVB).
Section 5	Hose connection vacuum breaker (HCVB).
Section 6	Dual check valve with atmospheric port (DCAP).
Section 7	Dual check valve (Dual CV).

Section 8	Dual check valve with intermediate vent (Du CV).
Section 9	Pressure type vacuum breaker (PVB).
Section 10	Double check valve (DCV).
Section 11	Double check detector assembly (DCDA).
Section 12	Reduced pressure zone device (RPZD).
Section 13	Reduced pressure detector assembly (RPDA).
Section 14	Spill-resistant pressure vacuum breaker (SPVB).
Section 15	Beverage dispenser dual check device with atmospheric port (BDDC).
Section 16	Pipe interrupter device (PID).
Section 17	Single check valve (testable) (SCVT).
Section 18	Single check detector assembly (testable) (SCDAT).

1.3 NORMATIVE REFERENCES

The normative documents referred to in this Standard are listed in Appendix B.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 3500.0 and those below apply.

1.4.1 Air ports

Openings or series of openings through the body of a device connecting the free atmosphere with the liquid passageway of the device.

1.4.2 Allowable operating pressure (AOP)

The allowable internal pressure, excluding surge, that a component can safely withstand in service.

1.4.3 Allowable site test pressure (ASTP)

The maximum internal hydrostatic pressure that can be applied on site to a component in a newly installed pipeline.

1.4.4 Atmospheric air

Air of the surrounding atmosphere and at its existing pressure.

1.4.5 Backpressure

The difference between the pressure within any water service and a higher pressure within any vessel or pipework to which it is connected.

1.4.6 Back-siphonage

Backflow that occurs when the water supply pressure falls below atmospheric pressure.

1.4.7 Component

A part or sub-assembly of parts that contributes to the construction of a larger assembly or system.

1.4.8 Contaminant

Any solid, organisms, liquid or gas entering, or with the potential to enter and pollute, a drinking water supply.

1.4.9 Critical installation height (CIH)

A distance determined from the prescribed minimum difference in height between the CL reference mark on any vacuum breaker, and the spill level of the fixture or receptacle it protects. In the absence of a physical mark, the level of the lowest part of the body housing is deemed to be the reference mark.

1.4.10 Critical installation level

A designated operational limitation prescribing a safe height for the installed backflow preventer above the flood level rim of the receptacle served. In the absence of a physical mark on the device indicating a height measurement reference point, the extreme bottom of the device is considered to be the height reference point.

1.4.11 Critical level (CL)

A reference position on any vacuum breaker, at which point back-siphonage ceases, when a vacuum is present at the device inlet, and the device is fouled.

1.4.12 Independently acting non-return valve

With reference to any backflow prevention device that contains two or more check valves, a valve containing no common parts other than a body housing, has no contact between any of the moving parts of a non-return valve and any of the moving parts of any other non-return valve through the normal operation, and so constructed that the total failure of any non-return valve does not affect the operation of the other non-return valve in the device.

1.4.13 Maximum allowable operating pressure (MAOP)

The allowable internal pressure, including surge, that a component can safely withstand in service.

1.4.14 Maximum operating temperature (MOT)

The maximum temperature at which a device can be safely operated.

1.4.15 Ports (vents)

Any opening(s) incorporated into a backflow preventer which allows air to enter the device under conditions of back-siphonage, or allows water to drain from the device under conditions of backpressure backflow.

1.4.16 Pressure class (PN)

A classification of devices by a PN number based on the allowable operating pressure expressed in hundreds of kilopascals.

1.4.17 Rated flow

The rate of flow of a fluid through a device, pipework, or similar, which has been established under specified test conditions. It may be expressed in litres per second or cubic metres per second.

1.5 TESTING APPARATUS, TESTING SEQUENCE AND INSTRUMENTATION

Testing apparatus, testing sequence and instrumention requirements shall be in accordance with Appendix C.

1.6 DESIGNATION OF SIZE

Devices size shall be designated by nominal sizes DN 6, DN 8, DN 10, DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300, DN 350, DN 400.

1.7 CLASSIFICATION

Devices shall be classified by a PN number on the basis of allowable operating pressure (AOP).

Standard pressure classifications are PN 10, PN 12 and PN 16; however, other pressure classifications are allowable, as follows.

(a) PN 10—for an allowable operating pressure of 1000 KPa.

(b) PN 12—for an allowable operating pressure of 1200 KPa.

(c) PN 16—for an allowable operating pressure of 1600 KPa.

1.8 ALLOWABLE PRESSURES AND FLOW VELOCITIES

The allowable pressures for devices are given in Table 1.1.

TABLE 1.1

CLASSIFICATION AND ALLOWABLE OPERATING CONDITIONS

PN	AOP (allowable operating pessure)	MAOP (maximum allowable operating pressure)	ASTP (allowable site test pressure)	Maximum flow velocity m/s	
	kPa	kPa	kPa	Rated	Emergency
10	1 000	1 200	1 250	5	7.5
12	1 200	1 440	1 500	5	7.5
16	1 600	1 920	2 000	5	7.5

SECTION 2 MATERIALS

2.1 GENERAL

This Section specifies requirements for materials for backflow prevention devices and associated fittings.

Materials used in the construction of backflow prevention devices and associated fittings shall be suitable for the conditions of use (that is, temperature, pressure, flow velocity and compatibility with any adjacent components).

Alternative materials to those specified in this Section may be used, provided they are equivalent in performance, particularly with respect to strength, corrosion-resistance, device operation and durability. Other permitted alternative materials may be specified by the purchaser.

NOTE: Material equivalence will be considered by a ruling committee of purchasers and suppliers selected by the Committee WS-023.

Non-metallic materials used in the componentry of devices shall be fit for the intended purpose and shall exhibit dimensional stability after extended periods of time immersed in water and wastewater.

Backflow prevention device component materials in contact with water shall be corrosion resistant.

2.2 STAINLESS STEEL

Stainless steel shall comply with the following:

(a) Wrought components—ASTM A276 types UNS S31603, S32750, S31803, S32205

(b) Tubular components—ASTM A269 types UNS S31603, S32750, S31803, S32205

(c) Cast components—ASTM A351 types CF8, CF8M. ASTM A890 types UNS J92205, UNS J93404.

(d) Springs and circlips—Stainless steel to ASTM A 313/313M types UNS Series S304, S316, S32750, S31803, and S32205.

NOTE: Other grades may be used, provided they meet the performance requirements of this Standard and have the equivalent corrosion-resistant properties.

2.3 FILLER METALS

Filler metals shall be one of the following:

(a) Silver brazing alloy complying with AS/NZS 1167.1.

(b) Copper phosphorus brazing alloy complying with AS/NZS 1167.1 with a minimum of 1.8% silver.

2.4 NICKEL-COPPER-IRON

Other than for springs and circlips, nickel-copper-iron alloys shall comply with one of the following:

(a) ASTM B127.

(b) ASTM B163.

(c) ASTM B164.

(d) ASTM B165.

2.5 FERROUS MATERIALS

2.5.1 General

Other than for stainless steel, all ferrous materials such as steel, ductile iron and cast iron shall be coated in accordance with AS/NZS 4158.

2.5.2 Coating design

The coating system shall be fully effective for all internally wetted surfaces. The coating of ferrous components at all dissimilar metal interfaces shall form a complete seal in order to prevent formation of galvanic couples. This includes tapping points and retaining screws, which shall be sealed via the coating or an effective thread sealant. All surfaces that cannot be effectively coated and tested shall be of corrosion-resistant material.

2.6 COPPER

Copper shall comply with the following:

(a) Wrought product—AS 2738.

(b) Tubular components—Copper pipe complying with AS 1432 or NZS 3501.

2.7 COPPER ALLOYS

Copper alloys shall comply with the following:

(a) Springs and circlips—Copper nickel alloy to AS/NZS 2738 alloy C70610 or Alloy C71630.

(b) Springs and circlips—Phosphor bronze to AS/NZS 2738 alloy C51000.

(c) Castings—AS 1565.

(d) Hot pressings—AS/NZS 1568.

(e) Rod for machined parts—AS/NZS 1567.

(f) Tubular components—Copper alloy pipe complying with AS 1572 alloy designation C 26130. Where bent or stamped in the fabrication process, the pipe to be sufficiently stress-relieved, so that it is capable of passing the mercurous nitrate test specified in AS 2136 after all fabrication processes are completed.

(g) Copper alloys that are buried and/or in contact with water shall be dezincification resistant (DR) in accordance with AS 2345.

2.8 ALUMINIUM ALLOYS

Aluminium alloys shall comply with AS 1874, Grade CA401, AA601, AA603 and AA607.

NOTE: Hydrant standpipes manufactured from aluminium should be marked as 'Hydrant standpipe use only'.

2.9 CORROSION-RESISTANT METALLIC MATERIALS

For the purpose of this Standard the following materials are deemed to be corrosion resistant:

(a) Copper complying with Clause 2.6.

(b) Copper alloys complying with Clause 2.7.

(c) Materials for springs and circlips specified in Clauses 2.2(d) and 2.7(b).

(d) Stainless steels specified in Clause 2.2.

(e) Filler metals specified in Clause 2.3.

(f) Ferrous materials coated as specified in Clause 2.5.

(g) Aluminium alloys specified in Clause 2.8.

2.10 ELASTOMERIC MATERIALS

Shall comply with AS 1646.

2.11 PLASTICS

2.11.1 General

Plastics materials used in device components shall be of a type recommended by the polymer manufacturer as suitable and appropriate for use in the manufacture of the device component or otherwise demonstrate suitability. Characteristics to be taken into account shall include long-term resistance to pressure and creep, ultraviolet resistance, compatibility and resistance to variations in water quality and elevated temperatures.

2.11.2 Plastics-bodied devices

Plastics materials for device bodies shall comply with Appendix TT.

2.11.3 Acetal

Acetal plastics used for structural components that are in contact with the water supply shall be copolymer.

SECTION 3 COMMON DESIGN AND PERFORMANCE REQUIREMENTS

3.1 GENERAL

This Section specifies requirements for the design and manufacture of backflow prevention devices.

3.2 EFFECT ON WATER

Backflow Prevention devices shall comply with AS/NZS 4020.

A scaling factor of 0.01 shall be applied for devices DN 100 and above and 0.05 for devices <DN 100, except for HCVB and BDDC devices which shall be tested as end-of-line fittings.

3.3 PRESSURE AND TEMPERATURE RANGES

Backflow prevention devices shall be designed to withstand test pressures and temperatures as nominated in test procedures, as follows:

(a) *Pressure* Devices shall be tested at pressures, up to and including 1.5 times (AOP) (see Table 1.1).

(b) *Temperature* The following shall apply:

  (i) Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

  (ii) Devices designed for use in cold and heated water shall be tested up to and including their nominated maximum operating temperature (MOT).

3.4 DESIGN

3.4.1 Serviceability

Unless otherwise specified and except for hose connection vacuum breakers, the internal parts of the devices shall be accessible for inspection, repair or replacement.

All replaceable parts of assemblies of the same size and model shall be interchangeable with the original parts. Replaceable parts shall include but not limited to seat discs, springs and seat rings, and all flexible seats, diaphragms, O-rings and gaskets.

Testable devices shall be compatible with the field testing as specified in AS 2845.3 without removal of the device from the service pipeline.

3.4.2 Release of trapped air

Provision shall be made for bleeding trapped air from the device when it cannot be displaced by the normal flow of water.

3.4.3 Flexible valve seats and diaphragms

In addition to the requirements of Clause 3.3(b), diaphragms, devices, disc seat facings and other flexible non-metallic parts shall be designed for continuous exposure to water, including chlorinated water, at the maximum rated operating temperature of the device without change in physical characteristics (i.e., corrosion-resistance and anti-adhesive properties).

3.5 END CONNECTIONS

3.5.1 General

End connections shall comply with AS 3688. Flanges shall comply with AS 4087, AS 2129 or AS/NZS 4331. The use of flanged adaptors is acceptable.

NOTE: Requirements for end connections in New Zealand may differ from above requirements.

3.5.2 Hose connections

Hose connections shall be threaded in accordance with AS 1722.2.

3.5.3 Test tap outlets

Test tap outlets shall have either an internal thread complying with AS ISO 7.1 or AS 1722.2 (see Table 3.1), or an external thread complying with ANSI/ASME B1.20.1 requirements.

TABLE 3.1

MINIMUM SIZE OF TEST TAP OUTLET THREADS

Nominal size of device DN	Minimum thread size*
25 and smaller	⅛/6
32 to 150	¼/8
200 and larger	¾/20

* AS 1722.2

3.5.4 Water meter connection ends

The thread form of water meter connection ends shall be in accordance with AS 1722.2 or in accordance with the requirements of the network utility operator.

NOTE: The water meter type and form of connection ends may require network utility operator approval.

3.6 VALVE SEATINGS

The seat or the valve disc shall be of an elastomeric resilient material.

3.7 STRUCTURAL TESTS

3.7.1 General

Structural tests shall be performed prior to other tests. The tests shall be performed in the sequence shown in Clauses 3.7.2 to 3.7.7. All of the tests shall be performed on the same sample of each type of device.

3.7.2 Torque

When tested in accordance with Appendix D, devices, other than HCVB, shall be capable of withstanding the applied torque given in Table D1, Appendix D, as applicable, without permanent deformation, breakage or damage to threads.

3.7.3 Heated water

Devices intended for heated water installation shall be tested in accordance with Appendix E.

3.7.4 Positive pressure

When tested in accordance with Appendix F, the device shall be capable of withstanding the appropriate test pressures for the pressure rating of the device at the required temperatures without leakage or distortion.

3.7.5 Reverse pressure

When tested in accordance with Appendix G, each non-return valve shall be capable of withstanding, without leakage or distortion, a backpressure of not less than the test pressure specified with atmospheric pressure on its upstream side.

This test does not apply to atmospheric vacuum breakers (AVB), pressure vacuum breakers (PVB), spill-resistant pressure vacuum breakers (SPVB) and hose connection vacuum breakers (HCVB).

3.7.6 Endurance

There shall be no replacement of parts during or following completion of the cycling of the endurance test, although cleaning of internal parts is acceptable following completion of test.

3.7.7 Non-testable devices (low hazard)

For retesting following endurance cycling, non-return valves shall not be fouled.

3.8 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for each device shall be as specified in Appendix A.

SECTION 4 ATMOSPHERIC VACUUM BREAKER (AVB)

4.1 GENERAL

This Section specifies the requirements for atmospheric vacuum breakers (see Figure 4.1). Vacuum breakers incorporate the components specified in Clause 4.3 and are required to pass performance tests specified in Clause 4.5.

4.2 APPLICATION

An atmospheric vacuum breaker is a device designed for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage. It is not intended for use in systems subject to continuous pressure.

4.3 COMPONENTS

4.3.1 Ventilation valve

A ventilation valve shall be provided. The valve shall be capable of venting the system to the atmosphere whenever the water pressure drops to or below atmospheric pressure, thereby providing airflow upstream if there are back-siphonage conditions in the pipework.

4.3.2 Non-return valve

A non-return valve shall be provided upstream of the vent valve.

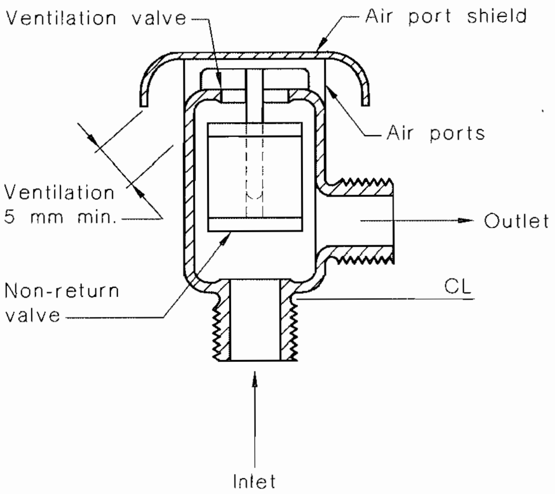


FIGURE 4.1 SCHEMATIC DIAGRAM OF A TYPICAL ATMOSPHERIC VACUUM BREAKER

4.4 SPECIFIC DESIGN REQUIREMENTS

4.4.1 Air port shields

Air port shields shall be designed to—

(a) be arranged to extend down and around the body of the device to the lowest portion of the air port; and

(b) provide an airflow passage of not less than 5 mm in width.

4.4.2 Critical level (CL) mark

Where the device is a separate unit and there is no mark, the lowest part of the body housing shall be deemed the CL mark. Where the device is incorporated in a downstream tube supplied by the manufacturer, a CL mark shall be inscribed on the outside surface of the tube.

4.5 PERFORMANCE TESTS

4.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

4.5.2 Air port opening area

When tested in accordance with Appendix H, the air ports shall admit a volume rate of airflow to the water outlet equal to or greater than the volume rate of airflow through the water inlet to the water outlet under equal vacuum.

4.5.3 Water rise

When tested in accordance with Appendix I, the device shall not permit a water rise of more than 75 mm in the sight tube connected to the water outlet of the device, when the non-return valve is held open with fouling wire in accordance with Appendix C during varied vacuum applications ranging from 0 to 85 kPa below atmospheric pressure, applied at the water inlet of the device.

4.5.4 Rated flow and pressure loss

When tested in accordance with Appendix K, the maximum pressure loss across the vacuum breaker at the rated water flow shall be as given in Table 4.1.

4.5.5 Ventilation valve leakage

When tested in accordance with Appendix L, and taken from atmospheric pressure up to 1400 kPa, there shall be no leakage of water from the air ports.

4.5.6 Critical level

When tested in accordance with Appendix M there shall be no evidence of water present in the transparent water trap after the vacuum surge loading test.

4.5.7 Endurance

After completion of endurance test in accordance with Appendix J, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 4.5.3 and 4.5.8 (see Table C2, Appendix C).

For post-endurance test, non-return valves shall not be fouled.

TABLE 4.1

RATED FLOW AND PRESSURE LOSS

Nominal size of device DN	Rated flow L/s	Maximum pressure loss kPa
15	0.75	150
20	1.90	140
25	3.10	125
32	4.7	125
40	6.3	110
50	10.0	110
65	14.2	110
75	20.2	105

4.5.8 Ability to resist adhesion between the ventilation valve sealing elements

When tested in accordance with Appendix PP, there shall be no back-siphonage of water from the downstream piping into the supply piping when the non-return valve seat or disc is fouled in accordance with Appendix C, under varied applications ranging from 0 to 85 kPa below atmospheric pressure applied to the water upstream of the device.

4.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for atmospheric vacuum breakers shall be as specified in Tables A1 and A2, Appendix A.

SECTION 5 HOSE CONNECTION VACUUM BREAKER (HCVB)

5.1 GENERAL

This Section specifies the requirements for hose connection vacuum breakers (see Figure 5.1). Hose connection vacuum breakers incorporate the components specified in Clause 5.3 and are required to pass performance tests in accordance with Clause 5.5.

5.2 APPLICATION

A hose connection vacuum breaker is a device designed for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage or low head (30 kPa) backpressure. It is not intended for use in systems subject to continuous pressure conditions.

5.3 COMPONENTS

5.3.1 Ventilation valve

A ventilation valve shall be provided to vent the hose to the atmosphere whenever the water pressure in the pipework drops below the pressure in the hose connected to the outlet.

5.3.2 Non-return valve

A non-return valve shall be provided, and shall be capable of being arranged to be force-loaded to the closed position.

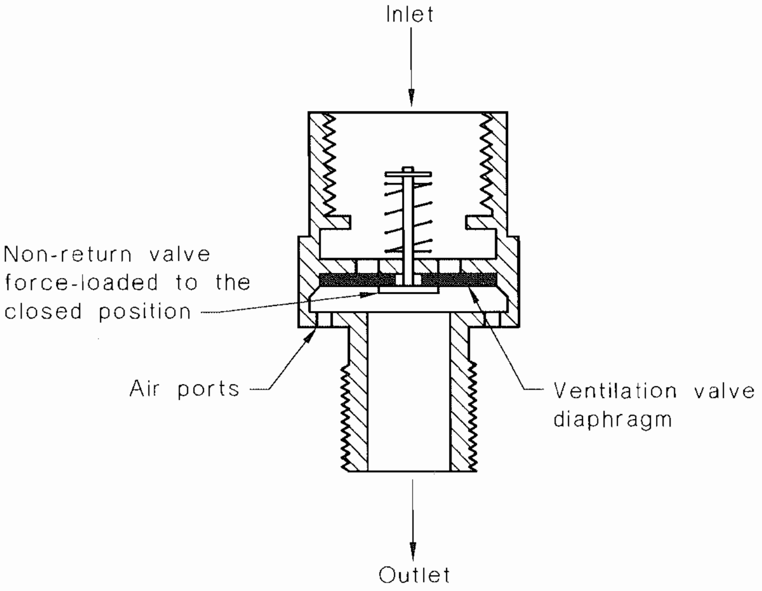

Inlet
Non-return valve force-loaded to the closed position
Air ports
Ventilation valve diaphragm
Outlet

FIGURE 5.1 SCHEMATIC DIAGRAM OF A TYPICAL HOSE CONNECTION VACUUM BREAKER

5.4 SPECIFIC DESIGN REQUIREMENTS

5.4.1 Air ports locations

Air ports shall be located so as to prevent the possibility of port fouling when installed in accordance with manufacturer's installation requirements.

5.4.2 Air ports opening area

The least total cross-sectional area of the airflow passage, including the seat area of the air vent device, shall be not less than the least total cross-sectional area of the waterflow passage or passages upstream from the ventilation device. The minimum cross-sectional dimension of any port or air passage, other than the valve lift, shall be not less than 1.5 mm.

5.4.3 Security

Means shall be provided, in conjunction with the threaded inlet, to prevent the ready removal of the device from the tap to which it is connected.

NOTE: This is not a mandatory requirement for DN 15.

5.5 PERFORMANCE TESTS

5.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

5.5.2 Leakage from air ports

When determined in accordance with Appendix N, the leakage rate from the air ports shall not exceed the following:

(a) Below 20 kPa upstream pressure; .... 0.15 L/min.

(b) At or above 20 kPa upstream pressure; .... no leakage.

5.5.3 Resistance to bending

When tested in accordance with Appendix O, devices shall withstand a bending moment of 35 Nm applied at the upstream end of the device without permanent distortion or damage that will affect their functioning capabilities. A device shall not leak during or at the conclusion of the test.

5.5.4 Ability to resist and relieve backpressure

When tested in accordance with Appendix P, as the upstream pressure is suddenly released, the device shall relieve the downstream pressure through the air ports.

5.5.5 Backpressure

When tested in accordance with Appendix Q, there shall be no backflow of water through the non-return valve into the supply line when the air ports are sealed and a backpressure within a range of 150 mm to 3000 mm water head is applied downstream of the device.

NOTE: For example, appearance of coloured water in the sight glass will be cause for rejection.

5.5.6 Back-siphonage

When tested in accordance with Appendix R, there shall be no back-siphonage of water from the downstream piping into the supply piping when the non-return valve seat or disc is fouled, in accordance with Paragraph C1.9, Appendix C, under varied vacuum applications ranging from 0 to 85 kPa below atmospheric pressure applied to the water upstream of the device. The crown of the meniscus in the sight tube shall not rise more than 3 mm.

Where the ventilation valve diaphragm (see Figure 5.1) of the device acts as a secondary non-return valve, fouling wires shall be positioned in accordance with Figure C1, Appendix C.

5.5.7 Rated flow and pressure loss

When tested in accordance with Appendix S, the maximum pressure loss across the device at the rated waterflow shall be as given in Table 5.1.

TABLE 5.1

RATED FLOW AND PRESSURE LOSS

Nominal size of device DN	Rated flow L/s	Maximum pressure loss kPa	Inlet/Outlet DN
15	0.2	175	15
15	0.4	175	20
20	0.6	175	25

5.5.8 Endurance

After completion of the endurance test in accordance with Appendix T, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 5.5.6 and 5.5.7 (see Table C2, Appendix C). Non-return valves shall not be used during post-endurance tests.

5.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for hose connection vacuum breakers shall be as specified in Tables A3 and A4, Appendix A.

SECTION 6 DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

6.1 GENERAL

This Section specifies the requirements for dual check valves with atmospheric port (see Figure 6.1). Dual check valves with atmospheric port incorporate the components specified in Clause 6.3 and are required to pass performance tests in accordance with Clause 6.5.

6.2 APPLICATION

A dual check valve with atmospheric port is a device designed for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage or backpressure. It is intended for use under continuous or intermittent pressure conditions.

6.3 COMPONENTS

6.3.1 Ventilation valve

A ventilation valve shall be provided, which shall be capable of being force-loaded to the open position when the supply pressure is both at atmospheric, and at 20% less than the downstream pressure.

6.3.2 Non-return valves

Two independently acting non-return valves shall be arranged to be force-loaded to the closed position.

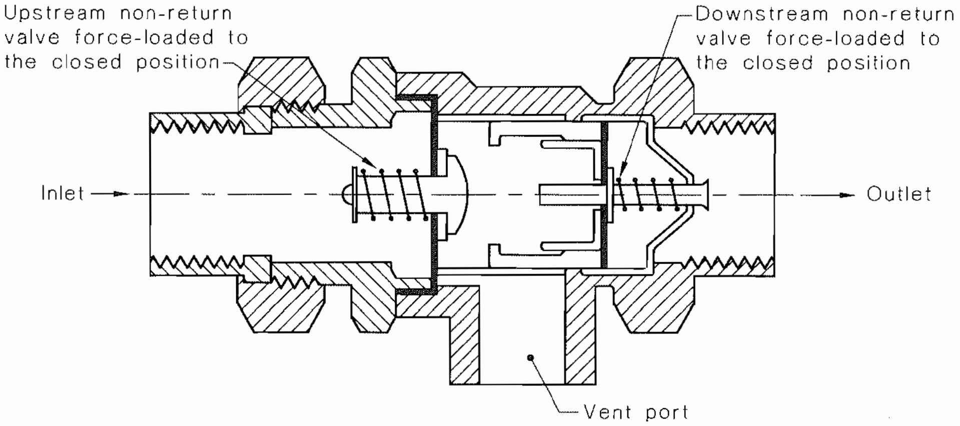

Upstream non-return valve force-loaded to the closed position
Downstream non-return valve force-loaded to the closed position
Inlet
Outlet
Vent port

FIGURE 6.1 SCHEMATIC DIAGRAM OF A TYPICAL DUAL CHECK VALVE WITH ATMOSPHERIC PORT

6.4 SPECIFIC DESIGN REQUIREMENTS

6.4.1 Airflow passage, cross-sectional area

The least total cross-sectional area of the airflow passage, including the seat area of the ventilation valve, shall be not less than the least total cross-sectional area of the water flow passage or passages upstream from the ventilation valve. The minimum cross-sectional dimension of any air port or passage, not including the valve lift or ventilation valve lift, shall be not less than 2.4 mm.

6.4.2 Air port outlet

The air port outlet shall be—

(a) located so as to prevent the possibility of port fouling when installed according to the manufacturer's installation requirements; and

(b) of a size and shape that cannot be threaded or connected with tubing either internally or externally.

6.5 PERFORMANCE TESTS

6.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

6.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, each non-return valve shall not leak at pressures up to 7 kPa applied in the direction of normal water flow.

6.5.3 Leakage from air ports

When tested in accordance with Appendix V, there shall be no leakage from the air ports for pressures up to the rated working pressure and at flow rates up to the rated flow.

6.5.4 Backflow through upstream non-return valve

When tested in accordance with Appendix W, there shall be no backflow of water into the upstream of the device when backpressures of 1.5 kPa, 100 kPa, and the maximum rated working pressure are applied in succession to the outlet of the device.

6.5.5 Ventilation valve opening pressure

When tested in accordance with Appendix X, the ventilation valve shall open to relieve backpressure due to backflow/backpressure before the supply pressure is 20% less than the downstream pressure.

6.5.6 Back-siphonage

When tested in accordance with Appendix R, there shall be no back-siphonage of water from the downstream piping into the supply piping when the upstream non-return valve seat or disc is fouled in accordance with Paragraph C1.9, Appendix C, and the downstream non-return valve is held open by mechanical means, under varied vacuum applications ranging from 0 kPa to 85 kPa below atmospheric pressure applied to the water upstream of the device. The crown of the meniscus in the sight glass shall not rise more than 3 mm.

6.5.7 Back-siphonage under backpressure

When tested in accordance with Appendix Y, there shall be no back-siphonage of water from the downstream piping into the supply piping when one non-return valve seat or disc is fouled in accordance with Appendix C under varied vacuum applications for separate backpressure conditions of 100 kPa and 350 kPa.

6.5.8 Rated flow and pressure loss

When tested in accordance with Appendix K, with a maximum pressure loss across the device of 175 kPa, the rated flow shall be as given in Table 7.1.

6.5.9 Flow with low supply pressure

When tested in accordance with Appendix AA, the device shall be capable of a flow of not less than 20% of its rated flow capacity when the supply pressure is 70 kPa.

6.5.10 Endurance

After completion of the endurance test in accordance with Appendix BB, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 6.5.2, 6.5.5, 6.5.6 and 6.5.7 (see Table C2, Appendix C). Non-return valves shall not be used for post-endurance tests.

6.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for dual check devices with atmospheric port shall be as given in Tables A5 and A6, Appendix A.

SECTION 7 DUAL CHECK VALVE (DUAL CV)

7.1 GENERAL

This Section specifies the requirements for dual check valves (see Figure 7.1). Dual check valves incorporate the components specified in Clause 7.3 and are required to pass the performance tests specified in Clause 7.4.

7.2 APPLICATION

A dual check valve is a device designed for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage or backpressure. It is intended for use under continuous pressure conditions.

7.3 COMPONENTS

Two independently acting non-return valves shall be provided, and shall be arranged in series and force-loaded to the closed position.

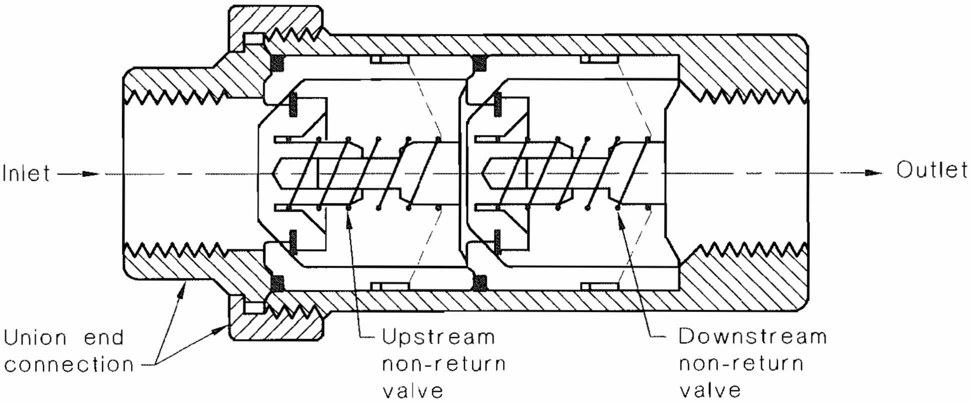


FIGURE 7.1 SCHEMATIC DIAGRAM OF A TYPICAL DUAL CHECK VALVE

7.4 PERFORMANCE TESTS

7.4.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

7.4.2 Non-return valve closing pressure

When tested in accordance with Appendix U, each non-return valve shall not leak against pressure up to 7 kPa applied in the direction of normal water flow, with the pressure downstream at atmospheric pressure.

7.4.3 Rated flow and pressure loss

When tested in accordance with Appendix K, with a maximum pressure loss of 50 kPa, the rated waterflow shall be as given in Table 7.1.

7.4.4 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 7.4.2 and 7.4.3 (see Table C2, Appendix C).

TABLE 7.1
RATED FLOW

Nominal size of device DN	Rated flow L/s
5	0.08
10	0.18
15	0.32
20	0.70
25	1.00
32	1.40
40	2.00
50	4.2
65	5.6
80	8.4
100	11
150	21
200	33
250	48.4
300	63.4

7.5 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for dual check devices shall be as given in Tables A7 and A8, Appendix A.

SECTION 8 DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

8.1 GENERAL

This Section specifies the requirements for dual check valves with intermediate vent (see Figure 8.1). Dual check valves with intermediate vent incorporate the components specified in Clause 8.3 and are required to pass performance tests specified in Clause 8.5.

8.2 APPLICATION

A dual check valve with intermediate vent is designed for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage or backpressure. It is not intended for use in systems subject to continuous pressure.

8.3 COMPONENTS

8.3.1 Ventilation valve

A ventilation valve shall be provided, which shall be open whenever the water pressure at the inlet drops to atmospheric pressure or below.

8.3.2 Non-return valves

Two independently acting non-return valves shall be provided, and shall be arranged to be force-loaded to the closed position.

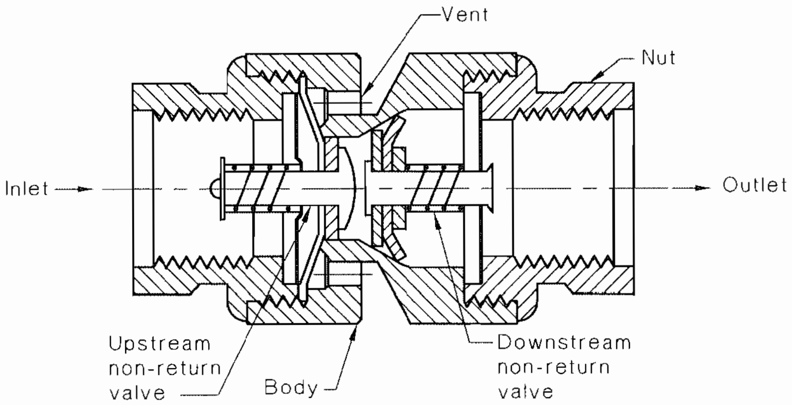


FIGURE 8.1 SCHEMATIC DIAGRAM OF A TYPICAL DUAL CHECK VALVE WITH INTERMEDIATE VENT

8.4 SPECIFIC DESIGN REQUIREMENTS

8.4.1 Air port locations

The air ports of dual check valves with intermediate vent shall be located so as to minimize the probability of port fouling.

8.4.2 Air ports opening area

The least cross-sectional area of the airflow passage, including the seat area of the air vent valve, shall be not less than the least cross-sectional area of the water flow passage or passages upstream of the ventilation valve. The minimum cross-sectional dimension of any air port or air passage, other than the valve lift, shall be not less than 1.5 mm.

8.5 PERFORMANCE TESTS

8.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

8.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, each non-return valve shall not leak against a pressure of 7 kPa applied in the normal direction of water flow with the pressure downstream at atmosphere.

8.5.3 Minimum flow capacity and pressure loss

When tested in accordance with Appendix K, the minimum flow capacity shall be 0.25 L/s and the maximum pressure loss 140 kPa.

8.5.4 Intermediate vent device leakage

When tested in accordance with Appendix N, there shall be no leakage of water from the intermediate vent port, at any flow rate up to the rated flow capacity of the device.

8.5.5 Back-siphonage

When tested in accordance with Appendix DD, there shall be no back-siphonage of water from the outlet of the device to the inlet, when both the upstream and downstream non-return valves are fouled in accordance with Paragraph C1.9, Appendix C, and a vacuum of 60 kPa is created at the inlet when the pressure at the outlet is atmospheric.

8.5.6 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 8.5.2 and 8.5.5 (see Table C2, Appendix C).

NOTE: A hot water test may be required.

8.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for dual check valves with intermediate vent shall be as given in Tables A9 and A10, Appendix A,.

SECTION 9 PRESSURE TYPE VACUUM BREAKER (PVB)

9.1 GENERAL

This Section specifies the requirements for pressure type vacuum breakers (see Figure 9.1). Pressure type vacuum breakers incorporate the components specified in Clause 9.3 and are required to pass performance tests specified in Clause 9.5.

9.2 APPLICATION

A pressure type vacuum breaker is a testable device designed for use in '*medium hazard*' conditions to prevent backflow caused by back-siphonage. It is intended for use under continuous pressure conditions.

9.3 COMPONENTS

9.3.1 Ventilation valve

A ventilation valve shall be provided. The valve shall be capable of being force-loaded to the open position, venting the pipework to atmosphere whenever the pressure in the device falls to 7 kPa.

9.3.2 Non-return valve

A non-return shall be provided upstream of the vent valve and shall be force-loaded to the closed position.

9.3.3 Test taps

Downstream and upstream test taps shall be provided to enable regular checking of the function of the non-return and ventilation valves.

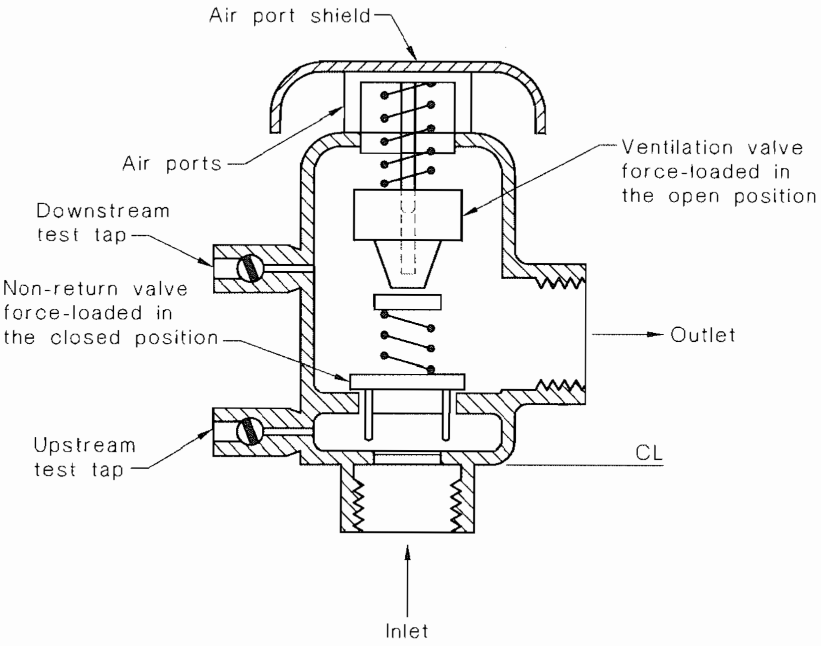

Air port shield
Air ports
Ventilation valve force-loaded in the open position
Downstream test tap
Non-return valve force-loaded in the closed position
Outlet
Upstream test tap
CL
Inlet

FIGURE 9.1 SCHEMATIC DIAGRAM OF A TYPICAL PRESSURE TYPE VACUUM BREAKER

9.4 SPECIFIC DESIGN REQUIREMENTS

9.4.1 Air port shields

Air port shields shall—

(a) extend down and around the body of the device to the lowest portion of the air port; and

(b) provide an airflow passage of not less than 5 mm in width.

9.4.2 Test taps

Test taps shall be provided in the device upstream and downstream of the non-return valve. The nominal size of tappings for test taps shall be in accordance with Clause 3.5.3.

9.4.3 Critical level mark

Critical level (CL) mark is a mark corresponding to the critical level on any vacuum breaker. Where the device is a separate unit and there is no CL mark, the lowest part of the body housing shall be deemed the CL mark. Where the device is incorporated in a downstream tube supplied by the manufacturer, a CL mark shall be inscribed on the outside surface of the tube.

9.5 PERFORMANCE TESTS

9.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

9.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, the non-return valve shall not leak against pressures up to 7 kPa applied in the direction of normal water flow, with the pressure downstream at atmospheric pressure.

9.5.3 Ventilation valve opening pressure

When tested in accordance with Appendix EE, the ventilation valve shall start to open before the pressure falls to 7 kPa and shall be fully open when the downstream chamber is drained.

9.5.4 Air port opening area

When the device is tested in accordance with Appendix H, the air ports shall admit a volume rate of airflow to the water outlet equal to or greater than the volume rate of airflow through the water inlet to the water outlet with the non-return valves held open under conditions of equal vacuum application.

9.5.5 Water rise

When tested in accordance with Appendix I, the device shall not permit a water rise of more than 3 mm in a sight tube connected to the water outlet of the device, when the non-return valve is held open with fouling wire in accordance with Paragarph C1.9, Appendix C, during varied vacuum applications ranging from 0 kPa to 85 kPa below atmospheric pressure at the water inlet of the device.

9.5.6 Rated flow

When tested in accordance with Appendix K, with a maximum pressure loss of 70 kPa, the rated waterflow shall be as given in Table 9.1.

TABLE 9.1

RATED FLOW

Nominal size of device DN	Rated flow L/s
15	1.25
20	1.9
25	3.2
32	4.75
40	6.3
50	10

9.5.7 Critical level

When tested in accordance with Appendix M, there shall be no evidence of water present in the transparent water trap after the vacuum surge loading test.

9.5.8 Endurance

After completion of the endurance test in accordance with Appendix FF, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 9.5.2, 9.5.3, 9.5.5 and 9.5.9 (see Table C2, Appendix C).

9.5.9 Ability to resist adhesion between the ventilation valve sealing elements

When tested in accordance with Appendix PP, there shall be no back-siphonage of water from the downstream piping into the supply piping when the non-return valve seat or disc is fouled in accordance with Paragraph C1.9, Appendix C, under varied applications ranging from 0 kPa to 85 kPa below atmospheric pressure applied to the water upstream of the device.

9.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for pressure type vacuum breakers shall be as given in Tables A11 and A12, Appendix A.

SECTION 10 DOUBLE CHECK VALVE (DCV)

10.1 GENERAL

This Section specifies the requirements for double check valves (see Figure 10.1). Double check valves incorporate the components specified in Clause 10.3 and are required to pass performance tests specified in Clause 10.5.

10.2 APPLICATION

A double check valve is a testable device designed for use in '*medium hazard*' conditions to prevent backflow caused by back-siphonage or backpressure. It is intended for use under continuous pressure conditions.

10.3 COMPONENTS

10.3.1 Non-return valve

Two independently acting non-return valves shall be provided and shall be arranged in series and force-loaded to the closed position.

10.3.2 Test taps

Test taps shall be provided to enable regular checking of the performance of the non-return valves.

NOTE: This excludes hydrant stand pipe devices.

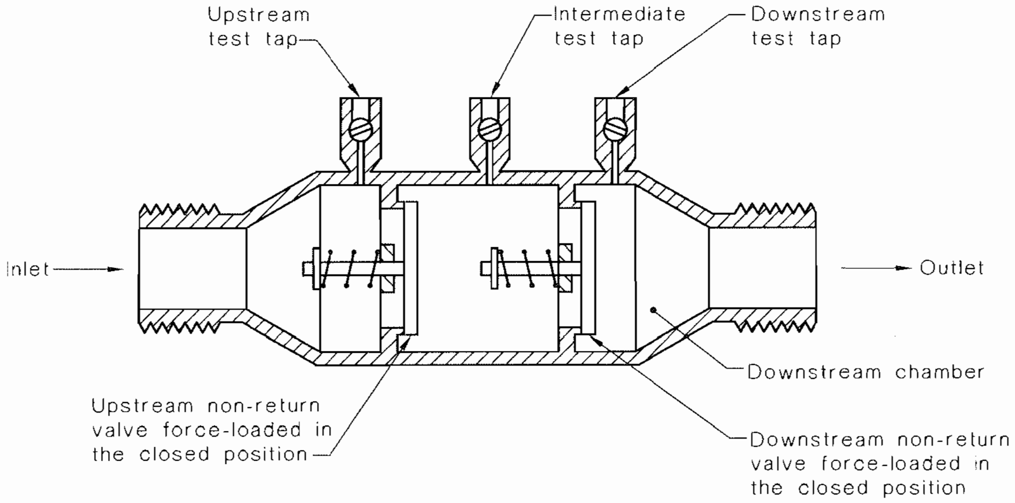

Upstream test tap
Intermediate test tap
Downstream test tap
Inlet
Outlet
Downstream chamber
Upstream non-return valve force-loaded in the closed position
Downstream non-return valve force-loaded in the closed position

FIGURE 10.1 SCHEMATIC DIAGRAM OF A TYPICAL DOUBLE CHECK VALVE

10.4 SPECIFIC DESIGN REQUIREMENTS

Test taps shall be provided in the device upstream of the upstream non-return valve, downstream of the downstream non-return valve, and in the intermediate chamber. Nominal pipe size of the tappings for test taps shall be as specified in Clause 3.5.3.

10.5 PERFORMANCE TESTS

10.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

10.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, each non-return valve shall not leak against pressures up to 7 kPa applied in the direction of normal waterflow, with the pressure downstream at atmospheric pressure.

10.5.3 Rated flow

When tested in accordance with Appendix K, with a maximum pressure loss of 70 kPa, the rated water flow shall be as given in Table 10.1.

TABLE 10.1

RATED FLOW

Nominal size of device DN	Rated flow L/s
15	1.25
20	1.9
25	3.2
32	4.75
40	6.3
50	10
65	14
80	20
100	32
150	63
200	100
250	145
300	190
350	230
400	275

10.5.4 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clause 10.5.2 (see Table C2, Appendix C).

10.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for double check valves shall be as given in Tables A13 and A14, Appendix A.

SECTION 11 DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

11.1 GENERAL

This Section specifies the requirements for double check detector assemblies (see Figure 11.1). Double check detector assemblies incorporate the components specified in Clause 11.3 and are required to pass the following performance tests:

(a) Test specified in Section 10, other than the test of Clause 10.5.3

(b) Special performance test specified in Clause 11.4.

11.2 APPLICATION

A double check detector assembly is a testable device designed for use in '*medium hazard*' conditions to prevent backflow caused by backpressure or back-siphonage. It is intended for use in fire service lines under continuous pressure and allows monitoring of small draw-offs of water.

11.3 COMPONENTS

11.3.1 Main double check valve

Two independently acting non-return valves shall be provided and shall be arranged in series and be capable of being force-loaded to the closed position. (Refer to Clauses 10.3.1 and 11.4).

11.3.2 Bypass line

The main double check valve shall have a bypass line of a minimum DN 20 size, and shall be installed bridging from upstream of the upstream non-return valve to downstream of the downstream non-return valve and incorporate two lockable isolating valves, complying with ATS 5200.012. The inlet and outlet connections of the main device body bypass shall be of the same nominal size or larger than the selected nominal size of the bypass assembly.

11.3.3 Water meter

A water meter, complying with AS 3565.1 and of the same nominal size as the bypass line, shall be installed in the bypass line.

NOTES:

1 The pressure loss of a water meter conforming to AS 3565.1 will need to be considered in the design of the DCDA.

2 For devices with meters DN 50 and larger on the bypass line, the required upstream and downstream straight lengths of bypass pipework need to be considered in the design of the device.

11.3.4 Secondary double check valve

A double check valve, complying with Section 10 and Clause 11.4 and of the same nominal size as the bypass line, shall be installed in the bypass line downstream of the water meter.

11.4 PERFORMANCE TEST

11.4.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

11.4.2 Pressure drop

When the assembly is tested in accordance with Appendix U, the sum of the pressure drops across the upstream and downstream non–return valves of the main double check valve shall be not less than 20 kPa higher than the sum of pressure drops across the non-return valves of the secondary double check device.

11.4.3 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clause 11.4.2 (see Table C2, Appendix C).

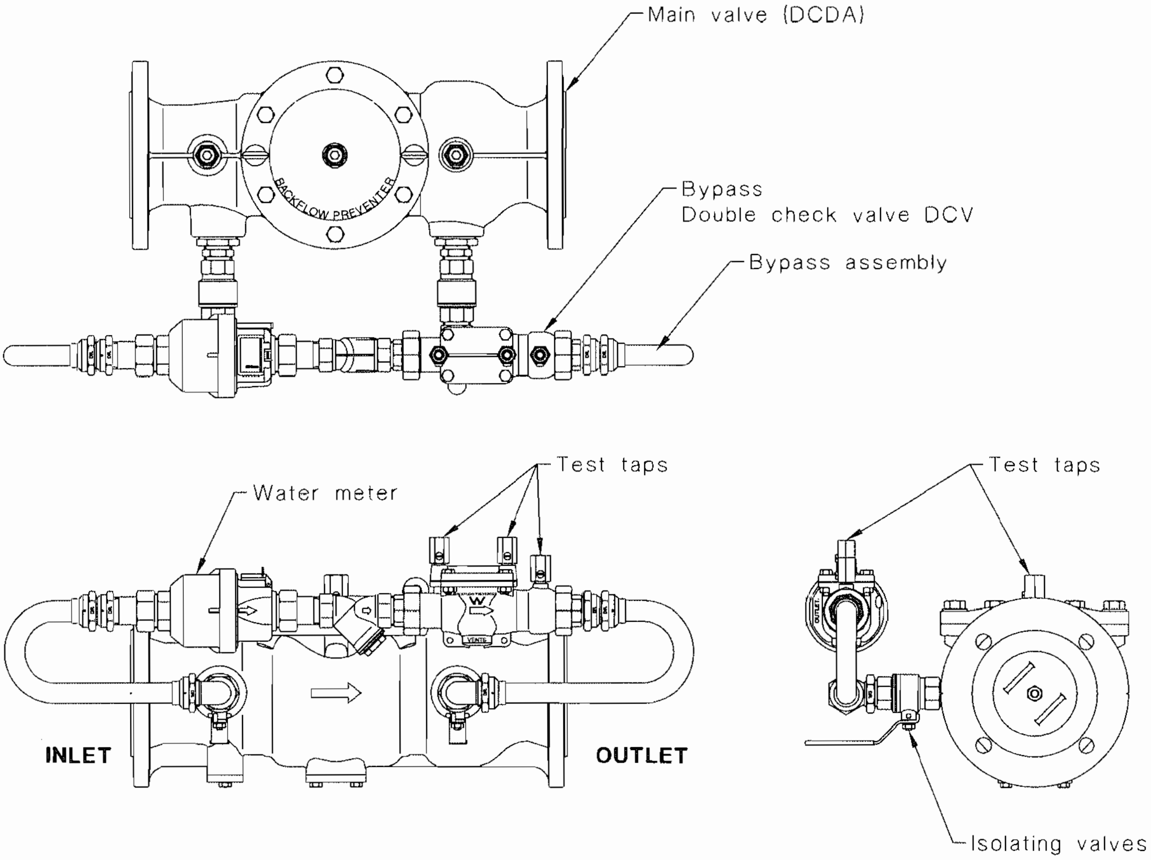


FIGURE 11.1 SCHEMATIC PLAN VIEW OF A TYPICAL DOUBLE CHECK DETECTOR ASSEMBLY

11.5 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for double check detector assemblies shall be as given in Tables A15 and A16, Appendix A.

SECTION 12 REDUCED PRESSURE ZONE DEVICE (RPZD)

12.1 GENERAL

This Section specifies the requirements for reduced pressure zone devices (see Figure 12.1). Reduced pressure zone devices incorporate the components specified in Clause 12.3 and are required to pass performance tests specified in Clause 12.5.

12.2 APPLICATION

A reduced pressure zone device is a testable device designed for use in '*high hazard*' conditions to prevent backflow caused by back-siphonage or backpressure. It is intended for use under continuous pressure conditions.

12.3 COMPONENTS

12.3.1 Non-return valves

Two independently acting non-return valves shall be provided and shall be arranged in series and force-loaded to the closed position.

12.3.2 Relief valve

A relief valve, positioned between the non-return valves, shall be provided and shall be arranged to be forced-loaded to the open position to atmosphere, whenever the pressure differential across the upstream non-return valve reduces to 14 kPa.

12.3.3 Test taps

Test taps shall be provided to enable regular checking of the performance of the non-return valves and the relief devices.

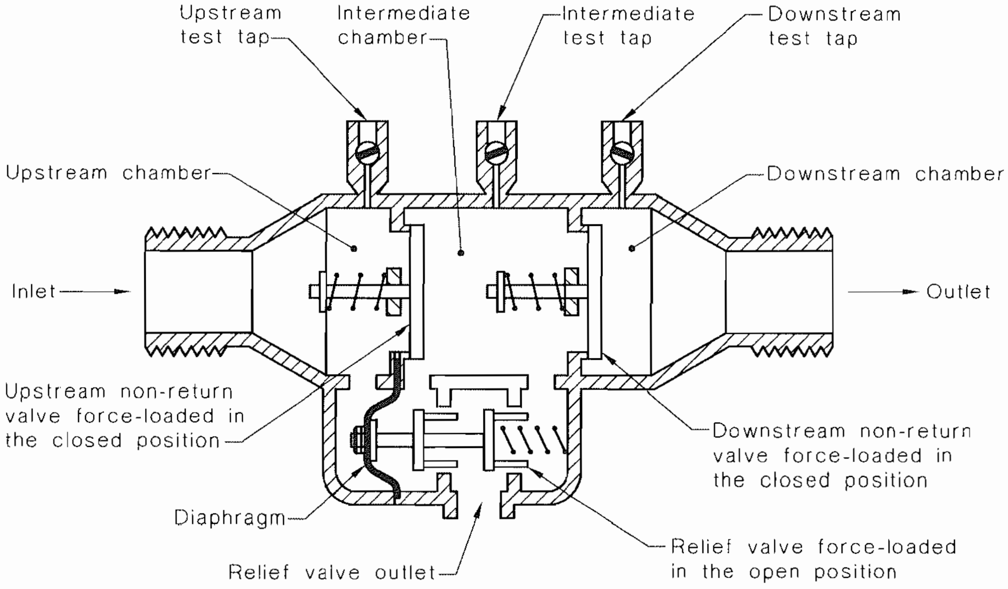

Upstream test tap
Intermediate chamber
Intermediate test tap
Downstream test tap
Upstream chamber
Downstream chamber
Inlet
Outlet
Upstream non-return valve force-loaded in the closed position
Downstream non-return valve force-loaded in the closed position
Diaphragm
Relief valve force-loaded in the open position
Relief valve outlet

FIGURE 12.1 SCHEMATIC DIAGRAM OF A TYPICAL REDUCED PRESSURE ZONE DEVICE

12.4 SPECIFIC DESIGN REQUIREMENTS

12.4.1 Relief valve diaphragm or equivalent

Diaphragms (or equivalent) shall be installed in a manner which, in case of failure, shall produce visible evidence of failure.

12.4.2 Test taps

Test taps shall be provided upstream of the upstream non-return valve, downstream of the downstream non-return valve, and in the intermediate chamber. Nominal pipe size of the tappings for test taps shall be as specified in Clause 3.5.3.

12.4.3 Relief valve opening

The relief device shall comply with the following:

(a) The relief valve discharge outlet shall be protected against collection of debris, which could reduce the flow area and adversely affect the performance of the device.

(b) The relief valve outlet shall be of a size and shape that cannot be threaded or connected with tubing, either internally or externally.

(c) The minimum total cross-sectional area of relief valve passageways shall be as given in Table 12.1. The minimum dimension of all passageways and openings shall be not less than 5 mm.

TABLE 12.1

MINIMUM WATERFLOW RATES AND MINIMUM CROSS-SECTIONAL AREA OF RELIEF VALVE PASSAGEWAYS FOR REDUCED PRESSURE ZONE DEVICES

Nominal size of device DN	**Rated flow through relief device** L/s	**Minimum total cross-sectional area of relief device passageways** mm^2
6	0.06	70
10	0.19	70
15	0.19	70
20 and 25	0.32	120
32 and 40	0.63	280
50 and 65	1.25	490
80	1.9	790
100 and 150	2.5	1 130
200 and 250	3.75	1 960
300	4.75	3 120
350	5.7	4 420
400	6.3	4 420

12.5 PERFORMANCE TESTS

12.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

12.5.2 Downstream non-return valve closing pressure

When tested in accordance with Appendix U, the downstream non-return valve shall not leak against a pressure up to 7 kPa applied in the direction of normal waterflow, with the downstream pressure at atmospheric.

12.5.3 Intermediate chamber pressure

When tested in accordance with Appendix GG, the pressure difference during static conditions shall be not less than 14 kPa.

12.5.4 Supply pressure at which the intermediate chamber becomes atmospheric

When tested in accordance with Appendix HH, when the pressure in the intermediate chamber (see Figure 12.1) is reduced to atmospheric pressure, the pressure in the upstream chamber shall be not less than 14 kPa.

12.5.5 Intermediate chamber pressure under backpressure conditions when the supply pressure is 14 kPa or greater

When tested in accordance with Appendix II, where there is a backflow and the supply pressure is greater than 14 kPa, the relief valve shall discharge water from the intermediate chamber to atmosphere at a rate not less than given in Table 12.1, and the pressure in the intermediate chamber shall be at least 3.5 kPa below the upstream pressure.

12.5.6 Intermediate chamber pressure under backpressure conditions, when the supply pressure is less than 14 kPa

When tested in accordance with Appendix JJ, where there is a backflow and the supply pressure is less than 14 kPa, the relief valve shall discharge water at a rate not less than that given in Table 12.1, and the pressure in the intermediate chamber shall not exceed 1050 mm of water pressure, as shown on the sight glass.

12.5.7 Pressure differential at which relief valve commences to open

When tested in accordance with Appendix KK, the relief valve shall start to open when the pressure in the intermediate chamber is not less than 14 kPa below the pressure at the inlet of the device, and the relief valve shall close drip-tight when the inlet pressure is restored.

12.5.8 Supply pressure fluctuations and discharge from relief valve

When tested in accordance with Appendix LL, the relief valve shall not discharge water under a supply pressure fluctuation having a maximum variation of ±10 kPa.

12.5.9 Rated flow and pressure loss

When tested in accordance with Appendix K, the maximum pressure loss across the device at rated waterflow shall be as given in Table 12.2.

TABLE 12.2

RATED FLOW

Nominal size of device DN	Rated flow L/s	Maximum pressure loss kPa
6	0.06	165
10	0.19	150
15	0.75	150
20	1.9	140
25	3.2	125
32	4.75	125
40	6.3	110
50	10	110
65	14	110
80	20	100
100	32	95
150	63	95
200	100	95
250	146	95
300	190	90
350	235	90
400	275	90

12.5.10 Back-siphonage

When tested in accordance with Appendix MM with both non-return valves fouled as required in Paragraph C1.9, Appendix C, the meniscus of the water in the sight tube shall not exceed the level of the water in the reservoir by more than 3 mm.

12.5.11 Backpressure

When tested in accordance with Appendix NN, with either check valve fouled as required in Clause C1.9, Appendix C, there shall be no backflow of water from the downstream pipework to the supply line when the downstream pressure exceeds the supply pressure.

12.5.12 Endurance

After completion of the endurance test in accordance with Appendix OO, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 3.7.5, 12.5.2, 12.5.3 and 12.5.7 (see Table C2, Appendix C).

12.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for reduced pressure zone devices shall be as given in Tables A17 and A18, Appendix A.

SECTION 13 REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

13.1 GENERAL

This Section specifies the requirements for reduced pressure detector assemblies (see Figure 13.1). Reduced pressure detector assemblies incorporate the components spedified in Clause 13.3 and are required to pass the following tests:

(a) Tests specified in Section 12, other than the test of Clause 12.5.9.

(b) The special performance test specified in Clause 13.4.

13.2 APPLICATION

A reduced pressure detector assembly is a testable device designed for use in '*high hazard*' conditions to prevent backflow caused by backpressure or back-siphonage. It is intended for use in fire service lines under continuous pressure and allows monitoring of small draw-offs of water.

13.3 COMPONENTS

13.3.1 Main reduced pressure zone valve

The main reduced pressure zone valve comprises two independently acting non-return valves. These valves shall be arranged in series to be force loaded to the closed position and shall comply with Section 12 and Clause 13.4.

13.3.2 Bypass line

A bypass line, of a minimum DN 20 size, shall be installed bridging from upstream of the upstream non-return valve to downstream of the downstream non-return valve of the main reduced pressure zone device, and incorporate two lockable isolating valves complying with ATS 5200.012. Inlet and outlet connections of the main device body bypass shall be the same nominal size or larger than the nominated bypass assembly nominal size.

13.3.3 Water meter

A water meter, complying with AS 3565.1, of the same nominal size as the bypass line, installed in the bypass line.

NOTES:

1 The pressure loss of a water meter conforming to AS 3565.1 will need to be considered in the design of the RPDA.

2 For devices with meters DN 50 and larger on the bypass line, the required upstream and downstream straight lengths of bypass pipework need to be considered in the design of the device.

13.3.4 Secondary reduced pressure zone device

A secondary reduced pressure zone device, complying with Section 12 and Clause 13.4, shall be installed in the bypass line downstream of the water meter and shall be of the same nominal size as the bypass line.

13.4 PERFORMANCE TEST

13.4.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

13.4.2 Pressure drop

When the assembly is tested in accordance with Appendices U, KK and LL, the sum of the pressure drops across the upstream and downstream non–return valves of the main reduced pressure zone device shall be not less than 20 kPa higher than the sum of pressure drops across the non-return valves of the secondary reduced pressure zone device.

13.4.3 Endurance

After completion of the endurance test in accordance with Appendix OO, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 3.7.5, 12.5.2, 12.5.3 and 12.5.7 (see Table C2, Appendix C).

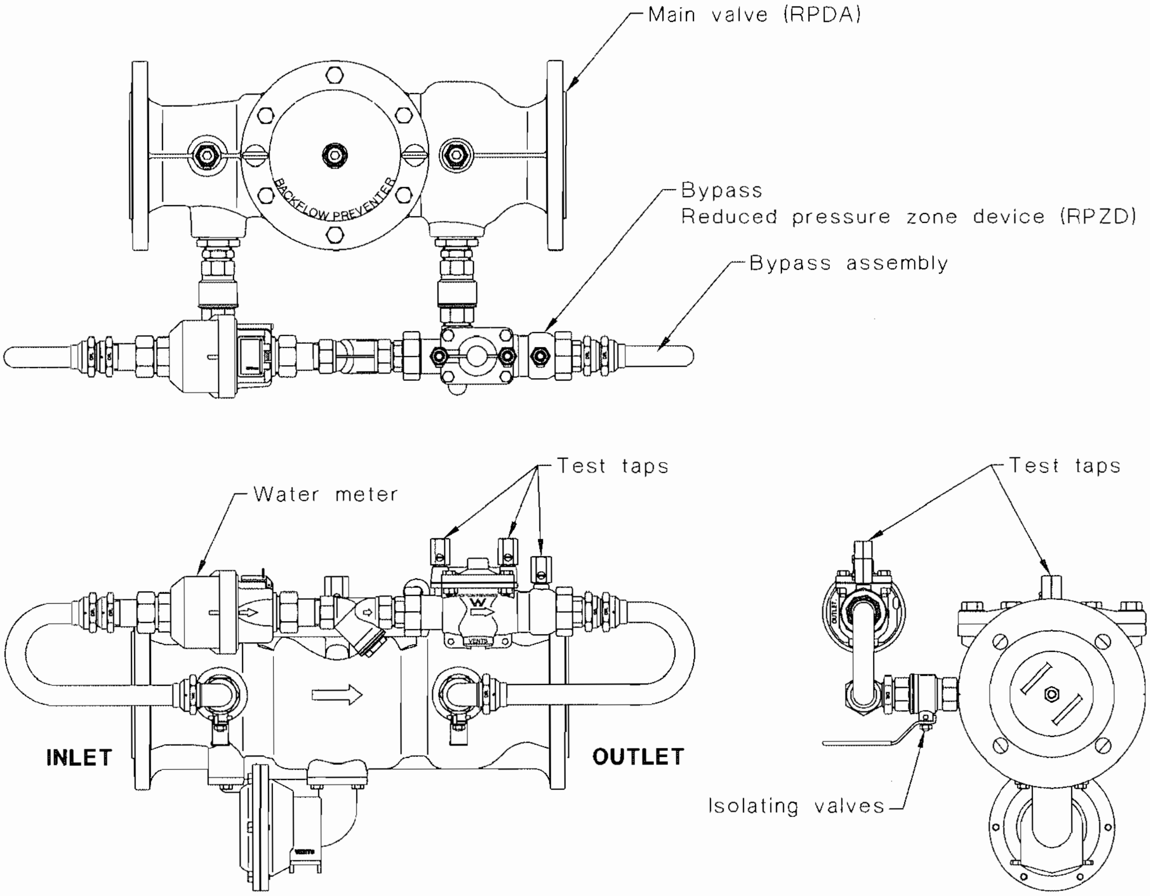


FIGURE 13.1 PLAN VIEW OF A TYPICAL REDUCED PRESSURE DETECTOR ASSEMBLY

13.5 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for reduced pressure zone assembly shall be as given in Tables A19 and A20, Appendix A.

SECTION 14 SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

14.1 GENERAL

This Section specifies the requirements for spill-resistant pressure vacuum breakers (see Figure 14.1). Spill-resistant pressure vacuum breakers incorporate the components specified in Clause 14.3 and are required to pass the performance tests specified in Clause 14.5.

NOTE: Spill-resistant pressure vacuum breakers are also referred to as anti-spill vacuum breakers in other jurisdictions.

14.2 APPLICATION

A spill-resistant pressure vacuum breaker is a testable device designed for use in '*high hazard*' conditions to prevent backflow caused by back-siphonage. It is intended for use under continuous pressure conditions. Application is limited to installations of mains pressure flushing devices.

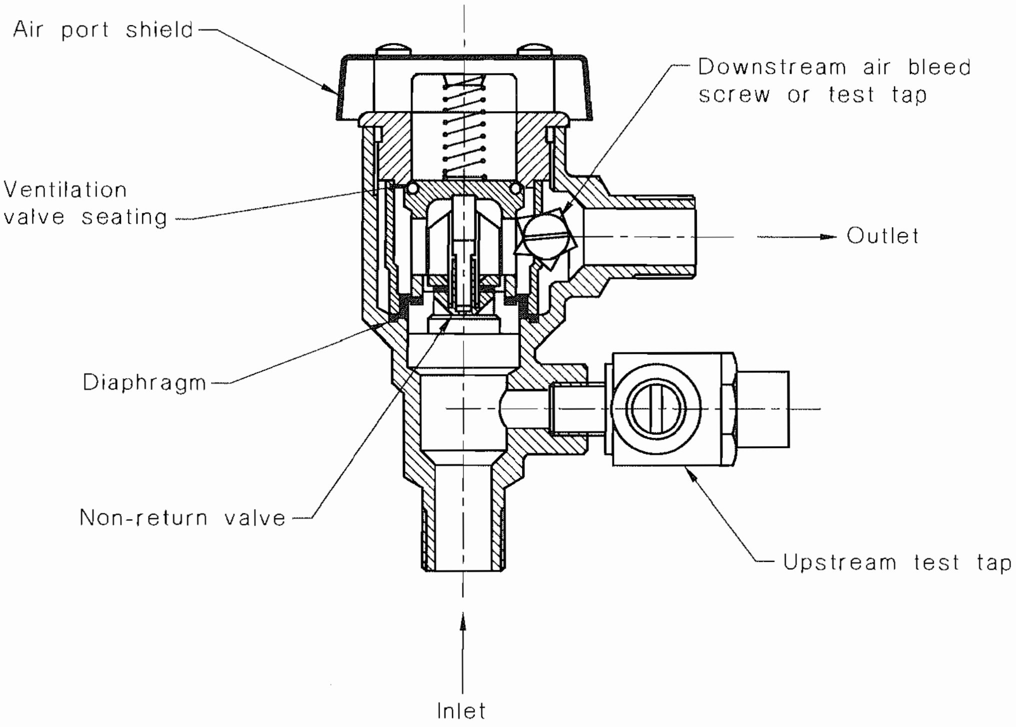


FIGURE 14.1 SCHEMATIC DIAGRAM OF A TYPICAL SPILL-RESISTANT PRESSURE VACUUM BREAKER

14.3 COMPONENTS

14.3.1 Ventilation valve

A ventilation valve shall be provided, which shall be capable of being force-loaded to the open position and venting the pipework to atmosphere whenever the pressure in the device falls to 7 kPa.

14.3.2 Air port entry seal

Means shall be provided to seal the air port entry before flow commences from the outlet of the device.

14.3.3 Non-return valve

A non-return valve arranged to be force-loaded to the closed position shall be provided.

14.3.4 Test points

Either a downstream and upstream test tap or an upstream tap and a downstream air bleed valve shall be provided, to enable regular checking of the function of the non-return and the ventilation valves.

14.4 SPECIFIC DESIGN REQUIREMENTS

14.4.1 Air port shields

Air port shields shall—

(a) extend down and around the body of the device to the lowest portion of the air port; and

(b) provide an airflow passage of not less than 5 mm in width.

14.4.2 Test points

For test points—

(a) test taps shall be provided upstream and downstream of the non-return valve; or

(b) a test tap shall provide upstream of the non-return valve and an air bleed shall be provided downstream of the non-return valve.

14.5 PERFORMANCE TESTS

14.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

14.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, the non-return valve shall not leak against pressures up to 7 kPa applied in the direction of normal water flow, with the pressure downstream at atmosphere pressure.

14.5.3 Ventilation valve opening pressure

When tested in accordance with Appendix EE, the ventilation valve shall start to open before the pressure falls to 7 kPa and shall be fully open when the upstream chamber is drained.

14.5.4 Air port entry seal

When tested in accordance with Appendix QQ, the air port entry shall close and remain closed whenever there is a water flow through the device.

14.5.5 Air port opening area

When the device is tested in accordance with Appendix H, the air ports shall admit a volume rate of airflow to the water outlet equal to or greater than the volume rate of airflow through the water inlet to the water outlet with the non-return valves held open under conditions of equal vacuum application.

14.5.6 Water rise

When tested in accordance with Appendix I, the device shall not permit a water rise of more than 3 mm in a sight tube connected to the water outlet of the device, when the non-return valve (or valves) is held open with fouling wire in accordance with Paragraph C1.9, Appendix C, during varied vacuum applications ranging from 0 kPa to 85 kPa below atmospheric pressure at the water inlet of the device.

14.5.7 Rated flow and pressure loss

When tested in accordance with Appendix K with a flow rate given in Table 14.1, a maximum pressure loss across the device shall not exceed 70 kPa.

TABLE 14.1

RATED FLOW

Nominal size of device DN	Rated flow L/s
6	0.19
10	0.38
15	0.76
20	1.9
25	3.2
32	4.75
40	6.31
50	10.00

14.5.8 Critical level

When tested in accordance with Appendix M, there shall be no evidence of water present in the transparent water trap after the vacuum surge loading test.

14.5.9 Ability to resist adhesion between the ventilation valve sealing elements

When tested in accordance with Appendix PP, there shall be no back-siphonage of water from the downstream piping into the supply piping when the non-return valve seat or disc is fouled in accordance with Paragraph C1.9, Appendix C, under varied applications ranging from 0 kPa to 85 kPa below atmospheric pressure applied to the water upstream of the device.

14.5.10 Endurance

After completion of the endurance test in accordance with Appendix FF, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 14.5.2, 14.5.3, 14.5.4 and 14.5.6 (see Table C2, Appendix C).

14.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for spill-resistant pressure vacuum breakers shall be as given in Tables A21 and A22, Appendix A.

SECTION 15 BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

15.1 GENERAL

This Section specifies the requirements for beverage dispensing dual check valves with an atmospheric port (see Figure 15.1). Dual check valves incorporate the components specified in Clause 15.3 and are required to pass the performance tests in Clause 15.5.

15.2 APPLICATION

A beverage dispenser dual check valve with atmospheric port is a device designed for use in '*low hazard*' conditions to prevent backflow caused by backpressure in carbonated beverage dispensing equipment. It is intended for use under continuous pressure conditions.

15.3 COMPONENTS

15.3.1 Ventilation valve

A ventilation valve, located between the non-return valves, shall be provided, and shall be arranged to be force-loaded to the open position to admit air whenever the water pressure at the inlet to the device reduces to a nominated value below the downstream pressure.

15.3.2 Non-return valves

Two independently acting non-return valves shall be provided and shall arranged to be force-loaded to the closed position.

15.3.3 Air port

An air port, in direct communication with the ventilation valve (between the non-return valves) that admits air to the inner chamber shall be provided to prevent back-siphonage or to enable a discharge from the chamber between the non-return valves under a condition of backpressure should the downstream non-return valve become fouled.

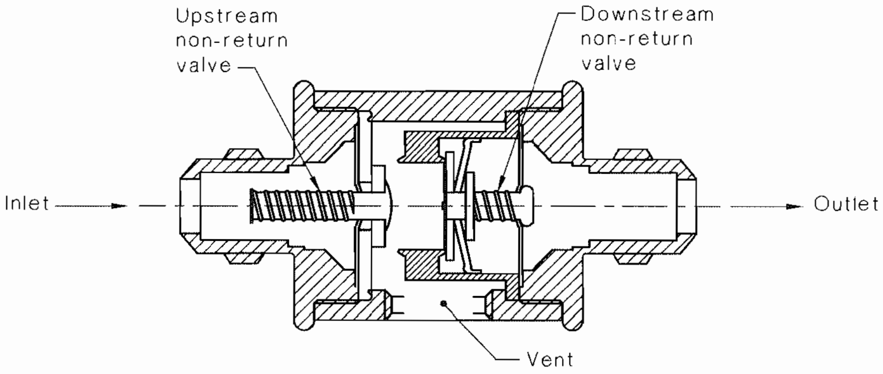


FIGURE 15.1 SCHEMATIC DIAGRAM OF A TYPICAL BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT

15.4 SPECIFIC DESIGN REQUIREMENTS

15.4.1 Air port

The air port shall be so located that when the device is installed according to the manufacturer's instructions no part of the air port shall be obstructed.

15.4.2 Air port shields

Where used, the air port shields shall comply with the requirements of Clause 4.4.1.

15.4.3 Air port opening area

The least cross-sectional area of the airflow passage, including the seat area of the ventilation valve, shall be not less than the least cross-sectional area of the water passage upstream of the air port.

15.4.4 Strainers

Strainer shall have a 100 mesh screen.

NOTE: Strainers may be integral.

15.5 PERFORMANCE TESTS

15.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

15.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U each non-return valve shall not leak at pressures up to 7 kPa applied in the direction of normal water flow

15.5.3 Air port leakage

When tested with water in accordance with Appendix V, there shall be no leakage from the air port for pressures up to the maximum rated working pressure and at flow rates up to the rated flow.

15.5.4 Backflow through upstream non-return valve

When tested in accordance with Appendix W, there shall be no backflow of water into the upstream of the device when backpressures of 1.5 kPa, 100 kPa and the maximum rated working pressure are applied in succession to the outlet of the device.

15.5.5 Ventilation valve opening pressure

When installed in accordance with the manufacturer's instructions and tested with air in accordance with Appendix X, the ventilation valve shall open when the pressure at the inlet of the device is—

(a) at or below atmospheric pressure; or

(b) when the pressure at the inlet is 20% below the downstream pressure.

15.5.6 Back-siphonage under backpressure

When tested in accordance with Appendix RR, there shall be no back-siphonage from the downstream piping to the upstream piping when the downstream non-return valve is removed or rendered inoperative by fouling the seat or disc in accordance with Paragraph C1.9, Appendix C for separate backpressure conditions of 100 kPa and 350 kPa.

15.5.7 Rated flow and pressure loss

When tested in accordance with Appendix K, with a maximum pressure loss of 175 kPa, the water flow shall be as given in Table 15.1.

TABLE 15.1

RATED FLOW

Nominal size mm	Rated flow L/s
6	0.06
10	0.10

15.5.8 Ability to withstand continuous pressure

When tested in accordance with Appendix E, there shall be no leakage or extrusion of the port diaphragm into the port, or change in the physical characteristic of flexible non-metallic components after 8 h continuous testing per day for a total of 80 h.

15.5.9 Endurance

After completion of the endurance test in accordance with Appendix SS, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 3.7.4, 15.5.2, 15.5.3 and 15.5.4, and 15.5.5 (see Table C2, Appendix C).

15.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for beverage dispenser dual check devices with atmospheric port shall be as given in Tables A23 and A24, Appendix A.

SECTION 16 PIPE INTERRUPTER DEVICE (PID)

16.1 GENERAL

This Section specifies requirements for the design, performance and testing of pipe interrupter devices (see Figure 16.1). Pipe interrupter devices incorporate the components specified in Clause 16.3 and are required to pass the performance tests specified in Clause 16.5.

16.2 APPLICATION

Pipe interrupter devices are for use in '*low hazard*' conditions to prevent backflow caused by back-siphonage. These devices are not suitable for use in systems subject to continuous pressure.

16.3 COMPONENTS—AIR INLETS

The pipe interrupter device shall be provided with air ports capable of venting the system to the atmosphere whenever the water pressure drops to or below atmospheric pressure, thereby providing airflow upstream if there are back-siphonage conditions in the pipework.

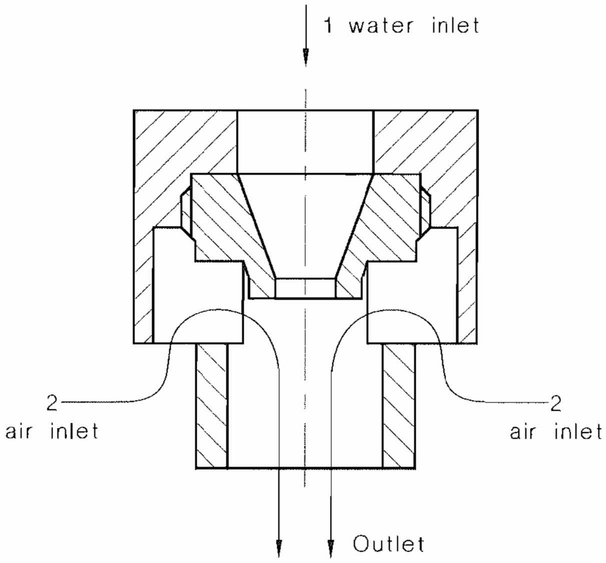


FIGURE 16.1 TYPICAL PIPE INTERRUPTER DEVICE WITH PERMANENT ATMOSPHERIC INLET

16.4 SPECIFIC DESIGN REQUIREMENTS

16.4.1 Air ports

Air ports shall be designed to comply with the following:

(a) The air ports shall be unrestricted and permanent.

(b) The water shall flow vertically downwards. The device shall prevent backflow by venting to atmosphere all the downstream and upstream elements.

(c) Air ports shall be arranged evenly around the body of the device to allow airflow.

(d) An air port passage, not less that 4 mm in width, shall be provided.

16.5 PERFORMANCE TEST

16.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

16.5.2 Torque test for screwed end devices

Devices with threaded ends shall be tested in accordance with Appendix D.

16.5.3 Air inlets

When tested in accordance with Appendix H, the air ports shall admit a volume rate of airflow to the water outlet equal to or greater than the volume rate of airflow through the water inlet to the water outlet under equal vacuum and the crown of the meniscus in the sight tube shall not rise.

16.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for pipe interrupter devices shall be as given in Tables A25 and A26, Appendix A.

SECTION 17 SINGLE CHECK VALVE (TESTABLE) (SCVT)

17.1 GENERAL

This Section specifies requirements for the design, performance and testing of single check valves (testable) (see Figure 17.1). A single check valve (testable) incorporates the components specified in Clause 17.3 and is required to pass the performance tests specified in Clause 17.5.

17.2 APPLICATION

A single check valve (testable) is designed for use in '*low hazard*' conditions in fire services to prevent backflow caused by back-siphonage or backpressure. It is intended for use under continuous pressure conditions.

NOTE: A single check valve (testable) is not acceptable as a backflow prevention device in New Zealand.

17.3 COMPONENTS

17.3.1 Non-return valve

One non-return valve shall be provided and shall be arranged to be force-loaded to the closed position.

17.3.2 Test taps

Test taps shall be provided to enable regular checking of the performance of the non-return valve.

17.4 SPECIFIC DESIGN REQUIREMENTS

Test taps shall be provided in the device upstream and downstream of the non-return valve. Nominal pipe size of the tappings for test taps shall be as specified in Clause 3.5.3.

17.5 PERFORMANCE TESTS

17.5.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

17.5.2 Non-return valve closing pressure

When tested in accordance with Appendix U, the non-return valve shall not leak against pressures up to 7 kPa applied in the direction of normal water flow, with downstream at atmospheric pressure.

17.5.3 Rated flow and pressure loss

When tested in accordance with Appendix K, with a maximum pressure loss of 35 kPa, the rated water flow shall be given as in Table 17.1.

TABLE 17.1

RATED FLOW

Nominal size mm	Rated flow L/s
65	14
80	20
100	32
150	63
200	100
250	145
300	190
350	230
400	275

17.5.4 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clause 17.5.2 (see Table C2, Appendix C).

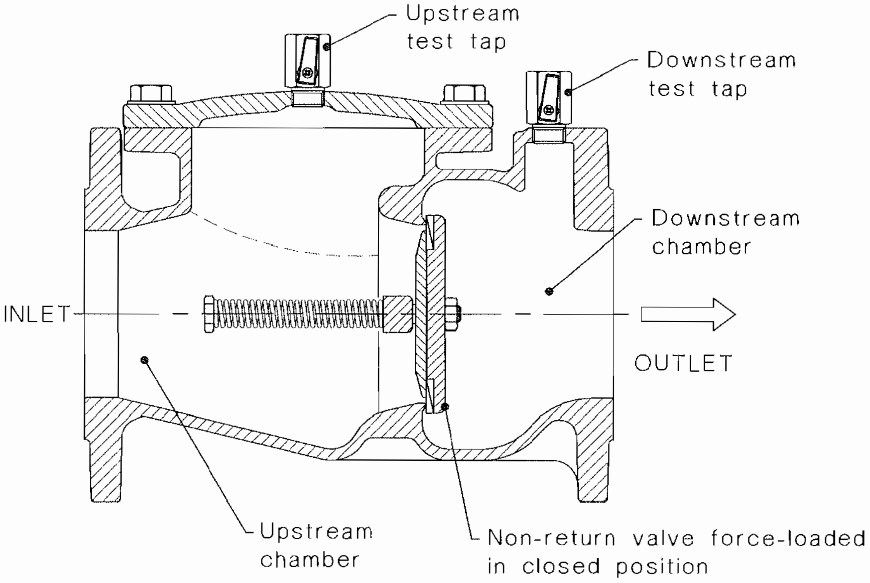


FIGURE 17.1 SCHEMATIC DIAGRAM OF A TYPICAL SINGLE CHECK VALVE (TESTABLE)

17.6 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for single check valves (testable) shall be as given in Tables A27 and A28, Appendix A.

SECTION 18 SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)

18.1 GENERAL

This Section specifies the requirements for single check detector assemblies (testable) (see Figure 18.1). A single check detector assembly incorporates the components specified in Clause 18.3 and is required to pass the following tests:

(a) Tests specified in Section 17, other than the test of Clause 17.5.3.

(b) The special performance test specified in Clause 18.4.

18.2 APPLICATION

A single check detector assembly is a testable device for use in '*low hazard*' conditions in fire services only, to prevent backflow caused by back-siphonage or backpressure. It is intended for use in fire services lines under continuous pressure conditions and to allow monitoring of small draw-offs of water.

NOTE: A single check detector assembly (testable) is not acceptable as a backflow prevention device in New Zealand.

18.3 COMPONENTS

18.3.1 Main single check device

The requirements for the main single check device in the assembly shall be as given in Clause 17.3.

18.3.2 Bypass line

A bypass line of minimum DN 20, bridging from upstream of the non-return valve to downstream of the non-return valve of the main single check valve shall be installed and incorporate two lockable isolating valves complying with ATS 5200.012. Inlet and outlet connections of main device body bypass shall be the same nominal size or larger than the nominated bypass assembly nominal size.

18.3.3 Water meter

A water meter, complying with AS 3565.1 of the same nominal size as the bypass line, shall be installed in the bypass line.

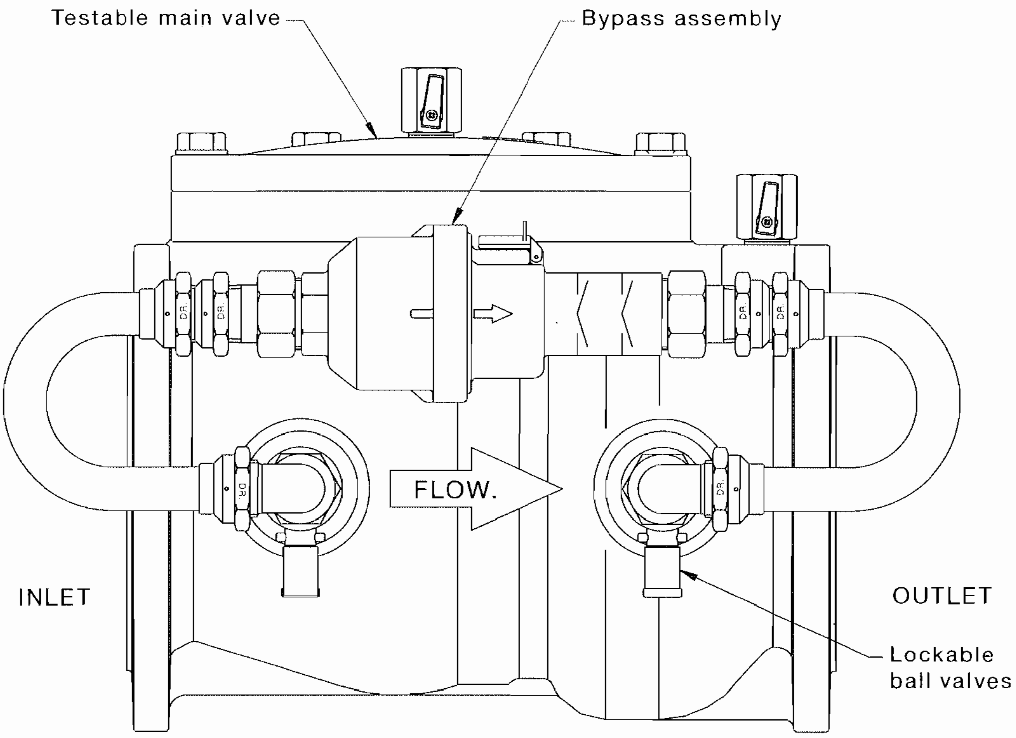
NOTES:

1 The pressure loss of a water meter conforming to AS 3565.1 will need to be considered in the design of the SCDAT.

2 For devices with meters DN 50 and larger on the bypass line, the required upstream and downstream straight lengths of bypass pipework need to be considered in the design of the device.

18.3.4 Secondary check device

A dual check valve, complying with Section 7, shall be installed in the bypass line downstream of the water meter and shall be of the same nominal size as the bypass line.



NOTE: The network utility operator may require additional design requirements incorporating various levels of protection in the bypass assembly.

FIGURE 18.1 SCHEMATIC DIAGRAM OF A TYPICAL SINGLE CHECK DETECTOR ASSEMBLY TESTABLE

18.4 PERFORMANCE TESTS

18.4.1 Procedures

Performance tests shall be conducted in the sequence shown in Table C2, Appendix C.

18.4.2 Pressure drop

When the assembly is tested in accordance with Appendix U, the sum of the pressure drop across the non-return valve of the main single check valve shall be not less than 10 kPa higher than the sum of pressure drop across the non-return valves of the secondary dual check device.

18.4.3 Endurance

After completion of the endurance test in accordance with Appendix CC, and subject to the requirements of Clause 3.7.6, the device shall comply with the requirements of Clauses 18.4.2 (see Table C2, Appendix C).

18.5 SAMPLING AND FREQUENCY PLANS

Compliance sampling and frequency plans for single check detector assemblies shall be as given in Tables A29 and A30, Appendix A.

SECTION 19 MARKING AND PACKAGING

19.1 MARKING

19.1.1 On the device

The following information shall be cast, stamped, etched or engraved on the device.

(a) Manufacturer's name or mark.

(b) Nominal size, DN.

(c) Pressure class, PN.

(d) Model or type number.

(e) Direction of water flow.

(f) Maximum operating temperature, in degrees Centigrade.

(g) For atmospheric and pressure type vacuum breakers, a CL mark if above the bottom of the device.

(h) The word 'Vents' on the atmospheric ports of RPZD, RPDA, Du CV and DCAP devices.

(i) The words 'Hydrant standpipe use only' for aluminium-bodied devices used with aluminium standpipes.

(j) The number of this Standard, i.e., AS/NZS 2845.1.

(k) For testable devices, a serial number (see Note).

NOTE: Serial number may be marked using a permanent label attached using an adhesive.

The lettering shall be as large as practicable, but not less than 3 mm for sizes DN 25 and smaller, 4 mm for sizes DN 32 to DN 65, 6 mm high for sizes DN 80–DN 150, 10 mm for DN 200–DN 300, 20 mm for DN 350 and larger.

19.1.2 Nameplate or label

Where, owing to size or any other reason, casting, stamping, etching or engraving of the above lettering is not practicable, such information shall be shown on an engraved stainless steel nameplate or permanent label.

The nameplate shall be securely attached to the rim of the flange or a raised pad on the device casting, using stainless steel or coated copper fasteners positioned to be clearly visible after installation.

The permanent label shall be attached using an adhesive.

Nameplates shall have minimum 3 mm etched or engraved letters. Labels shall be printed with minimum 3 mm letters.

19.2 PACKAGING

Devices shall be suitably packed to prevent damage to components, including protective coatings, during handling, transportation and storage.

SECTION 20 MANUFACTURER'S DATA

20.1 INSTALLATION INSTRUCTIONS

A complete set of installation instructions, in English, shall be available for each device. The instructions shall be consistent with the requirements of AS/NZS 3500.1 and shall include all information necessary for the correct installation of the device and, where applicable, shall also show the following:

(a) Location of isolating valves.

(b) Use of a line strainer.

(c) Minimum clearances required both in the vertical and horizontal planes.

20.2 MAINTENANCE INSTRUCTIONS

A complete set of maintenance instructions, in English, shall be available for each device. The instructions shall be consistent with the requirements of AS/NZS 3500.1 and include all information necessary for the correct maintenance of the device and a complete spare parts list.

APPENDIX A

MEANS FOR DEMONSTRATING COMPLIANCE WITH THIS STANDARD

(Normative)

A1 SCOPE

This Appendix sets out the means by which compliance of each device with this Standard has to be demonstrated by a manufacturer under the WaterMark product certification scheme.

A2 RELEVANCE

The long-term performance of plumbing systems is critical to the durability of building infrastructure, protection of public health and safety, and protection of the environment.

A3 PRODUCT CERTIFICATION

The purpose of product certification is to provide independent assurance of the claim by the manufacturer that products comply with this Appendix.

The certification scheme serves to indicate that the products consistently conform to the requirements of this Appendix and the sampling plans of each device.

The frequency of the sampling and testing plan as detailed in Paragraph A5, shall be used by the Conformity Assessment Body. Where a batch release testing program is required, it shall be carried out by the manufacturer as detailed in this Appendix for sampling and frequency plans.

A4 DEFINITIONS

A4.1 Batch release test

A test performed by the manufacturer on a batch of components, which is satisfactorily completed before the batch is released.

A4.2 Sample

One or more units of product drawn from a batch, selected at random without regard to quality.

NOTE: The number of units of product in the sample is the sample size.

A4.3 Sampling plan

A specific plan for each device given in this Appendix, which indicates the number of units of components or assemblies to be inspected.

A4.4 Type test batch

Schedule of units of the same type, identical dimensional characteristics, all the same nominal diameter and wall thickness, from the same materials. The batch is defined by the manufacturer.

A4.5 Type testing (TT)

Testing performed to demonstrate that the material, component, joint or assembly is capable of conforming to the requirements of this Standard.

A5 TESTING

A5.1 Type testing

This Appendix and Table 3.3 set out the requirements for type testing and the frequency of re-verification.

A5.2 Batch release testing

Tables A1 to A30 of this Appendix set out the minimum sampling and testing frequency plan for a manufacturer to demonstrate compliance of product(s) with this Standard on an ongoing basis. However, where the manufacturer can demonstrate adequate process control to the Conformity Assessment Body, the frequency of the sampling and testing nominated by the manufacturer's quality plan and/or documented procedures shall take precedence for the purposes of Watermark product certification.

A5.3 Retesting

In the event of a batch release test failure, the products within the batch may be retested at a frequency agreed to with the Conformity Assessment Body and only those batches found to comply may be claimed and/or marked as complying with this Appendix.

A6 SAMPLING AND FREQUENCY PLANS—TYPE TESTS AND BATCH RELEASE TESTS

A6.1 Atmospheric vacuum breaker (AVB)

The compliance sampling and frequency plans for atmospheric vacuum breakers shall be as given in Tables A1 and A2.

TABLE A1

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—ATMOSPHERE VACUUM BREAKER (AVB)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Device seats, diaphragms	Hot water at temperature	
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	

(continued)

TABLE A1 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	3.7.4	Long-term positive test for plastics-bodied devices	Appendix F	At change in design
	4.5.2	Air port opening area	Appendix H	
	4.5.3	Water rise	Appendix I	
	4.5.4	Water flow cap/pressure	Appendix K	
	4.5.5	Ventilation valve leakage	Appendix L	
	4.5.6	Critical level	Appendix M	
	4.5.7	Endurance	Appendix J	

TABLE A2

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—ATMOSPHERIC VACUUM BREAKER (AVB)

Characteristic	Clause	Requirement	Test method	Frequency
Design	4.4.1	Air port shields	Measure	Once per batch
	3.5	Threads	AS 3688	Once per batch
	4.4.2	Critical level mark	Visual inspection	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.11	Plastics materials	Relevant Standards	
Performance	4.5.2	Air port opening area	Appendix H	Once per batch
	4.5.5	Ventilation valve leakage	Appendix L	
	4.5.6	Critical level	Appendix M	

A6.2 Hose connection vacuum breaker (HCVB)

The compliance sampling and frequency plans for hose connection vacuum breakers shall be as given in Tables A3 and A4.

TABLE A3

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—HOSE CONNECTION VACUUM BREAKER (HCVB)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in materials
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 11834.1	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads	AS 3688	
	5.4.1	Air ports location	Visual inspection	
	5.4.2	Air-ports opening area	Visual inspection and measurement	
	5.4.3	Security	Visual inspection	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long-term positive test for plastics-bodied devices	Appendix F	At change in design
	5.5.2	Leakage from air ports	Appendix N	
	5.5.3	Resistance to bending	Appendix O	
	5.5.4	Resist/relieve backpressure	Appendix P	
	5.5.5	Backpressure	Appendix Q	
	5.5.6	Back-siphonage	Appendix R	
	5.5.7	Rated flow	Appendix S	
	5.5.8	Endurance	Appendix T	

TABLE A4

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—HOSE CONNECTION VACUUM BREAKER (HCVB)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads	AS 3688	Once per batch
	5.4.1	Air ports location	Visual inspection	Once per batch
	5.4.3	Security	Visual inspection (over DN 15)	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345	
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	3.7.4	Long-term positive test for plastics-bodied devices	Appendix F	Once per batch
	5.5.5	Backpressure	Appendix Q	
	5.5.6	Back-siphonage	Appendix R	

A6.3 Dual check valve with atmospheric port (DCAP)

The compliance sampling and frequency plans for dual check valves with atmospheric port shall be as given in Tables A5 and A6.

TABLE A5

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 11834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads	AS 3688	
	19.1	Marking	Visual Inspection	

(continued)

TABLE A5 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	3.7.4	Long-term positive test for plastics-bodied devices	Appendix F	At change in design
	6.5.2	Non-return valve closing pressure	Appendix U	
	6.5.3	Leakage from airports	Appendix V	
	6.5.4	Backflow	Appendix W	
	6.5.5	Ventilation valve opening pressure	Appendix X	
	6.5.6	Back-siphonage	Appendix R	
	6.5.7	Back-siphonage under backpressure	Appendix Y	
	6.5.8	Rated water flow capacity and pressure loss	Appendix K	
	6.5.9	Flow with low supply pressure	Appendix AA	
	6.5.10	Endurance	Appendix BB	

TABLE A6

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads	AS 3688	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	6.5.2	Non-return closing pressure	Appendix U	Once per batch
	6.5.5	Ventilation valve opening pressure	Appendix X	

A6.4 Dual check valve (Dual CV)

The compliance sampling and frequency plans for dual check valves shall be as given in Tables A7 and A8.

TABLE A7

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—DUAL CHECK VALVE (Dual CV)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 11834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature range	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads	AS 3688	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long-term positive test for plastics-bodied devices	Appendix F	At change in design
	7.4.2	Non-return valve closing pressure	Appendix U	
	7.4.3	Rated water flow capacity and pressure loss	Appendix K	
	7.4.4	Endurance	Appendix CC	

TABLE A8

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—DUAL CHECK VALVE (Dual CV)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads	AS 3688	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	7.4.2	Non-return valve closing pressure	Appendix U	Once per batch

A6.5 Dual check valve with intermediate vent (Du CV)

The compliance sampling and frequency plans for dual check valves with intermediate vent shall be as given in Tables A9 and A10.

TABLE A9

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Valve seats, diaphragms	Hot water at temperature	
	3.5	Threads	AS 3688	
	19.1	Marking	Visual inspection	

(continued)

TABLE A9 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	8.5.2	Non-return valve closing pressure	Appendix U	At change in design
	8.5.3	Rated water flow capacity and pressure loss	Appendix K	
	8.5.4	Leakage from air ports	Appendix N	
	8.5.5	Back-siphonage	Appendix DD	
	8.5.6	Endurance	Appendix CC	

TABLE A10

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads	AS 3688	Once per batch
	8.4.2	Air ports opening area	Measure	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	Visual test report	
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	8.5.4	Air port leakage	Appendix N	Once per batch
	8.5.2	Non-return valve closing pressure	Appendix U	

A6.6 Pressure type vacuum breaker (PVB)

The compliance sampling and frequency plans for pressure type vacuum breakers shall be as given in Tables A11 and A12.

TABLE A11

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—PRESSURE TYPE VACUUM BREAKER (PVB)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature range	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Valve seats, diaphragms	Hot water at temperature	
	3.5	Threads	AS 3688	
	19.1	Marking	Visual inspection	
Performance	9.5.2	Non-return valve closing pressure	Appendix U	At change in design
	9.5.3	Ventilation valve	Appendix EE	
	9.5.4	Air port opening	Appendix H	
	9.5.5	Water rise	Appendix I	
	9.5.6	Rated Flow	Appendix K	
	9.5.7	Critical Level	Appendix M	
	9.5.8	Endurance	Appendix FF	
	9.5.9	Ability to resist adhesion	Appendix PP	

TABLE A12

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—PRESSURE TYPE VACUUM BREAKER (PVB)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads	AS 3688	Once per batch
	9.4.1	Air port shields	Measure	Once per batch
	9.4.3	Critical level mark	Visual inspection	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.11	Plastics	Relevant Standards	
Performance	9.5.2	Non-return valve closing pressure	Appendix U	Each device
	9.5.3	Ventilation valve opening pressure	Appendix EE	
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.7 Double check valve (DCV)

The compliance sampling and frequency plans for double check valves shall be as given in Tables A13 and A14.

TABLE A13

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—DOUBLE CHECK VALVE (DCV)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 1834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first

(*continued*)

TABLE A13 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long-term positive pressure test for plastics-bodied devices	Appendix F	At change in design
	10.5.2	Non-return valve closing pressure	Appendix U	
	10.5.3	Rated Flow	Appendix K	
	10.5.4	Endurance	Appendix CC	

TABLE A14

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—DOUBLE CHECK VALVE (DCV)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Performance	10.5.2	Non-return valve closing pressure	Appendix U	Each device
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.8 Double check detector assembly (DCDA)

The compliance sampling and frequency plans for double check detector assemblies shall be as given in Tables A15 and A16.

TABLE A15

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 1834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long-term positive pressure test for plastics-bodied devices	Appendix F	At change in design
	10.5.2	Non-return valve closing pressure	Appendix U	
	10.5.3	Rated flow	Appendix K	
	10.5.3	Endurance	Appendix CC	

TABLE A16

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	At change in design
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Performance	10.5.2	Non-return valve closing pressure	Appendix U	Each device
	11.4.2	Pressure drop	Appendix U	
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.9 Reduced pressure zone device (RPZD)

The compliance sampling and frequency plans for reduced pressure zone devices shall be as given in Tables A17 and A18.

TABLE A17

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—REDUCED PRESSURE ZONE DEVICE (RPZD)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Device seats, diaphragms	Hot water at temperature	
	19.1	Marking	Visual inspection	

(continued)

TABLE A17 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	12.5.2	Downstream non-return valve closing pressure	Appendix U	At change in design
	12.5.3	Intermediate chamber pressure	Appendix GG	
	12.5.4	Supply pressure	Appendix HH	
	12.5.5	Intermediate chamber pressure, at backpressure supply is ≥14 kPa	Appendix II	
	12.5.6	Intermediate chamber pressure, at backpressure supply <14 kPa	Appendix JJ	
	12.5.7	Pressure differential	Appendix KK	
	12.5.8	Supply pressure fluctuations	Appendix LL	
	12.5.9	Rated flow and pressure loss	Appendix K	
	12.5.10	Back-siphonage	Appendix MM	
	12.5.11	Backpressure	Appendix NN	
	12.5.12	Endurance	Appendix OO	

TABLE A18

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—REDUCED PRESSURE ZONE DEVICE (RPZD)

Characteristic	Clause	Requirement	Test method	Frequency
Design	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	Once per batch
	12.4.1	Relief valve diaphragms	Failure test	Once per batch
	12.4.3	Relief valve opening	Visual inspection	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.11	Plastics	Relevant Standards	
Performance	12.5.2	Non-return valve closing pressure	Appendix U	Each device
	12.5.3	Intermediate chamber pressure	Appendix GG	
	12.5.4	Supply pressure at which the intermediate chamber becomes atmospheric	Appendix HH	
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.10 Reduced pressure detector assembly (RPDA)

The compliance sampling and frequency plans for reduced pressure detector assembly shall be as given in Tables A19 and A20.

TABLE A19

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Valve seats, diaphragms	Hot water at temperature	
	3.5	Threads, flanges	AS 3688, AS 4087, AS 4331	
	19.1	Marking	Visual inspection	

(*continued*)

TABLE A19 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	12.5.2	Downstream non-return valve closing pressure	Appendix U	At change in design
	12.5.3	Intermediate chamber pressure	Appendix GG	
	12.5.4	Supply pressure	Appendix HH	
	12.5.5	Intermediate chamber pressure, at backpressure supply ≥14 kPa	Appendix II	
	12.5.6	Intermediate chamber pressure, at backpressure supply <14 kPa	Appendix JJ	
	12.5.7	Pressure differential	Appendix KK	
	12.5.8	Supply pressure fluctuations	Appendix LL	
	12.5.9	Rated flow and pressure loss	Appendix K	
	12.5.10	Back-siphonage	Appendix MM	
	12.5.11	Backpressure	Appendix NN	
	12.5.12	Endurance	Appendix OO	

TABLE A20

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

Characteristic	Clause	Requirement	Test method	Frequency
Design	13.3.2	Bypass size	Measure	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	12.5.2	Downstream non-return valve closing pressure	Appendix U	Each device
	12.5.3	Intermediate chamber pressure	Appendix GG	
	12.5.4	Supply pressure at which the intermediate chamber becomes atmospheric	Appendix HH	
	13.4.2	Pressure drop	Appendices U, KK and LL	
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.11 Spill-resistant pressure vacuum breaker (SPVB)

The compliance sampling and frequency plans for spill-resistant pressure vacuum breakers shall be as given in Tables A21 and A22.

TABLE A21

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—SPILL-RESISTANT VACUUM BREAKER (SPVB)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.2	Release of trapped air	Visual inspection	
	3.4.3	Valve seats, diaphragms	Heat water at MOT	
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	
Performance	14.5.2	Non-return valve closing pressure	Appendix U	At change in design
	14.5.3	Ventilation valve opening pressure	Appendix EE	
	14.5.4	Air port entry seal	Appendix QQ	
	14.5.5	Air port opening area	Appendix H	
	14.5.6	Water rise	Appendix I	
	14.5.7	Rated flow and pressure loss	Appendix K	
	14.5.8	Critical level	Appendix M	
	14.5.9	Ability to resist adhesion	Appendix PP	
	14.5.10	Endurance	Appendix FF	

TABLE A22

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS— SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

Characteristic	Clause	Requirement	Test method	Frequency
Design	14.4.1	Air port shields	Measure	Once per batch
	14.4.1	Air port opening area	Measure	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	AS 2345 (DR) or chemical composition	
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	14.5.3	Ventilation valve opening pressure	Appendix EE	Each device
	14.5.4	Air port entry seal	Appendix QQ	
	14.5.2	Non-return valve closing pressure	Appendix U	
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.12 Beverage dispenser dual check valve with atmospheric port (BDDC)

The compliance sampling and frequency plans for beverage dispenser dual check valves with atmospheric port shall be as given in Tables A23 and A24.

TABLE A23

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips	ASTM A 313/313M	At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 1834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature range	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long-term positive pressure test plastics-bodied devices	Appendix F	At change in design
	15.5.2	Non-return valve closing pressure test	Appendix U	
	15.5.3	Air port leakage	Appendix V	
	15.5.4	Backflow	Appendix W	
	15.5.5	Ventilation valve opening pressure	Appendix X	
	15.5.6	Back-siphonage	Appendix RR	
	15.5.7	Rated flow	Appendix K	
	15.5.8	Continuous pressure	Appendix E	
	15.5.9	Endurance	Appendix SS	

TABLE A24

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

Characteristic	Clause	Requirement	Test method	Frequency
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	3.5	End connectors	Visual inspection (threads/connections)	Once per batch
	15.5.2	Non-return valve closing pressure	Appendix U	
	15.5.5	Ventilation device opening pressure	Appendix X	

A6.13 Pipe interrupter device (PID)

The compliance sampling and frequency plans for pipe interrupter devices shall be as given in Tables A25 and A26.

TABLE A25

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—PIPE INTERRUPTER DEVICE (PID)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips		At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.4.3	Valve seats, diaphragms	Hot water at temperature	
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	
Performance	16.5.3	Air port opening area	Appendix H	At change in design
		Back-siphonage	Appendix R	

TABLE A26

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—PIPE INTERRUPTER DEVICE (PID)

Characteristic	Clause	Requirement	Test method	Frequency
Design	16.4.1	Air inlets	Measure	Once per batch
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.7	DR copper alloy	Visual test report	
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	16.5.3	Air ports opening area	Appendix H	Once per batch

A6.14 Single check valve (testable) (SCVT)

The compliance sampling and frequency plans for single check valves (testable) shall be as given in Tables A27 and A28.

TABLE A27

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—SINGLE CHECK VALVE (TESTABLE) (SCVT)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips		At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 1834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	
Performance	3.7.4	Long positive pressure test for plastics-bodied devices	Appendix F	At change in design
	17.5.2	Non-return valve closing pressure	Appendix U	
	17.5.3	Rated flow	Appendix K	
	17.5.4	Endurance	Appendix CC	

TABLE A28

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—SINGLE CHECK VALVE (TESTABLE) (SCVT)

Characteristic	Clause	Requirement	Test method	Frequency
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	17.5.2	Non-return valve closing pressure	Appendix U	Each device
	AS/NZS 2845.3		AS/NZS 2845.3	

A6.15 Single check detector assembly (testable) (SCDAT)

The compliance sampling and frequency plans for single check detector assemblies (testable) shall be as given in Tables A29 and A30.

TABLE A29

MINIMUM SAMPLING AND TESTING FREQUENCY PLAN—TYPE TESTS—SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)

Characteristic	Clause	Requirement	Test method	Frequency
Material properties	2.2	Springs and circlips		At any change in material
	2.2	Stainless steel	AS 2837, AS 1769, AS 2074	
	2.3	Filler metals	AS/NZS 1167.1, AS 1834.1	
	2.4	Nickel-copper-iron	ASTM B127, B163, B164, B165	
	2.5	Ferrous materials	AS 4158	
	2.8	Aluminium alloys	AS 1874, NZS/AS 1874	
	2.9	Corrosion-resistant metallic materials	Relevant Standards	
	2.11	Plastics	Verify manufacturer's data	
	3.2	Effect on water	AS/NZS 4020	At change in materials or every 5 years, whichever occurs first
Design	3.3	Pressure and temperature ranges	Verify that correct test pressures and temperatures are nominated in test procedures	At change in design
	3.5	End connectors	AS 3688	
	19.1	Marking	Visual inspection	

(*continued*)

TABLE A29 (*continued*)

Characteristic	Clause	Requirement	Test method	Frequency
Performance	3.7.9	Long positive pressure test for plastics-bodied devices	Appendix F	At change in design
	17.5.2	Non-return valve closing pressure	Appendix U	
	17.5.4	Endurance	Appendix CC	
	18.4.2	Pressure drop	Appendix U	

TABLE A30

MINIMUM SAMPLING AND FREQUENCY PLAN—BATCH RELEASE TESTS—SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)

Characteristic	Clause	Requirement	Test method	Frequency
Materials	2.2 to 2.9	Metallic materials	Relevant Standards	Once per batch
	2.11	Plastics	Relevant Standards	
Marking	19.1	Marking	Visual inspection	Once per batch
Performance	3.5	Water leakage	Visual inspection (threads/connections)	Each device
	17.5.2	Non-return valve closing pressure	Appendix U	
	18.4.2	Pressure drop	Appendix U	
	AS/NZS 2845.3		AS/NZS 2845.3	

APPENDIX B

NORMATIVE DOCUMENTS

(Normative)

AS	
1349	Bourdon tube pressure and vacuum gauges
1432	Copper tubes for plumbing, gas fitting and drainage applications
1565	Copper and copper alloys—Ingots and castings
1572	Copper and copper alloys—Seamless tubes for engineering purposes
1646	Elastomeric seals for waterworks purposes
1722	Pipe threads of Whitworth form
1722.2	Part 2: Fastening pipe threads
1769	Welded stainless steel tubes for plumbing applications
1834	Material for soldering
1834.1	Part 1: Solder alloys
1874	Aluminium and aluminium alloys—Ingots and castings
2074	Cast steels
2129	Flanges for pipes, valves and fittings
2136	Method for detecting the susceptibility of copper and its alloys to stress corrosion cracking using the mercurous nitrate test
2345	Dezincification resistance of copper alloys
2738	Copper and copper alloys—Compositions and designations of refinery products, wrought products, ingots and castings
2845	Water Supply—Backflow prevention devices
2845.3	Part 3: Field testing and maintenance of testable devices
3558	Methods of testing plastics and composite materials sanitary plumbing fixtures
3558.5	Part 5: Determination of degradation by ultraviolet light
3565	Meters for water supply
3565.1	Part 1: Cold water meters
3688	Water supply—Metallic fittings and end connectors
4087	Metallic flanges for waterworks purposes
AS ISO	
7	Pipe threads where pressure-tight joints are made on the threads
7.1	Part 1: Dimensions, tolerances and designation
AS/NZS	
1167	Welding and brazing—Filler metals
1167.1	Part 1: Filler metal for brazing and braze welding
1167.2	Part 2: Filler metal for welding
1567	Copper and copper alloys—Wrought rods, bars and sections
1568	Copper and copper alloys—Forging stock and forgings
3500	Plumbing and drainage (series)

AS/NZS	
3718	Water supply—Tap ware
4020	Testing of products for use in contact with drinking water
4129	Fittings for polyethylene (PE) pipes for pressure applications
4158	Thermal-bonded polymeric coatings on devices and fittings for water industry purposes
4331	Metallic flanges
4331.1	Part 1: Steel flanges
4331.2	Part 2: Cast iron flanges
4331.3	Part 3: Copper alloy and composite flanges
NZS	
3501	Specification for copper tubes for water, gas and sanitation
ISO	
1167	Thermoplastic pipes, fittings and assemblies for the conveyance of fluids—Determination of the resistance to internal pressure
1167,1	Part 1: General method
1167,2	Part 2: Preparation of pipe test pieces
3459	Polyethylene (PE) pressure pipes—Joints assembled with mechanical fittings—Internal under-pressure test method and requirements
3501	Assembled joints between fittings and polyethylene (PE) pressure pipes—Test of resistance to pull out
3503	Assembled joints between fittings and polyethylene (PE) pressure pipes—Test of leakproofness under internal pressure when subjected to bending
4892	Plastics—Methods of exposure to laboratory light sources
4892-3	Part 3: Fluorescent UV lamps
7686	Plastics pipes and fittings—Determination of opacity
9080	Plastics piping and ducting systems—Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation
ASTM	
A276	Standard specification for stainless steel bars and shapes
A269	Standard specification for seamless and welded austenitic stainless steel tubing for general service
A351	Standard specification for castings, austenitic, for pressure-containing parts
A890	Standard specification for castings, iron-chromium-nickel-molybdenum corrosion-resistant, duplex (austenitic/ferritic) for general application
B127	Standard specification for nickel-copper alloy (UNS N04400) plate, sheet, and strip
B163	Standard specification for seamless nickel and nickel alloy condenser and heat-exchanger tubes
B164	Standard specification for nickel-copper alloy rod, bar, and wire
B165	Standard specification for nickel-copper alloy (UNS N04400) seamless pipe and tube
ANSI/ASME	
B1.20.1	Pipe threads, general purpose (inch)

APPENDIX C

TESTING APPARATUS, TEST SEQUENCE AND INSTRUMENTATION REQUIREMENTS

(Normative)

C1 TESTING APPARATUS

C1.1 Pressurizing system

A pressurizing system shall consist of a hydraulic system capable of producing the test pressure (supply and backpressures) at the required flow rates and testing temperatures whilst maintaining an accuracy of ±2% of the set value and of counting the number of pressure cycles if required.

C1.2 End connections

Watertight connections shall be made to the fitting within the socket or on the external surface.

The test specimen shall be supported and held in a suitable jig so that no external axial force is applied to the specimen when sealing off the openings. Pressure shall be applied through one of the end connections or sealing plugs.

Where adaptors are used, they shall have internal or external threads of the appropriate series designation in AS ISO 7.1 or AS 1722.2 to mate with the connections of the device under test. Care shall be taken that apparatus used for testing fittings with screw threads does not cause notching of the thread.

C1.3 Torque wrenches

Torque wrenches shall be graduated in newton metres and have open-end jaws to suit the wrench flats of the device on test.

C1.4 Timing devices

A timing device may be used on each test station to register the duration of the test on each test specimen until a specific event has occurred, or until the specified time of test has elapsed. This timing device shall monitor and record or stop when the test pressure or test temperature exceeds the specified tolerance.

NOTE: An electric contact pressure gauge is considered a satisfactory apparatus for switching the timing device when used in conjunction with a test gauge.

C1.5 Sight glass

A sight glass shall consist of a glass tube with an internal diameter of 10 +5, −0 mm and approximately 1 m long.

C1.6 Isolating valves

Isolating valves shall be resilient seated valves with a rated pressure greater than or equal to maximum test pressure of the pressurizing system.

C1.7 Testing environment

Tests may be conducted in a water bath, or circulating or still air.

C1.8 Conditioning of test devices

Conditioning of heated water devices shall be undertaken prior to testing. Conditioning of cold water devices prior to testing is not required.

Each test device shall be filled with water as required and conditioned at the test temperature for a period of not less than 1 h in either air or water, immediately prior to testing.

Conditioning in water may be carried out with the test specimen connected to the test apparatus.

C1.9 Fouling wires

Fouling wires shall be used where required in tests for moving components of backflow prevention devices.

Fouling wires shall consist of hard-drawn corrosion-resistant wire of diameters listed in Table C1. The fouling wire shall be provided by the manufacturer to suit the device under test, and shall be formed to suit the contour of the non-return device's seat.

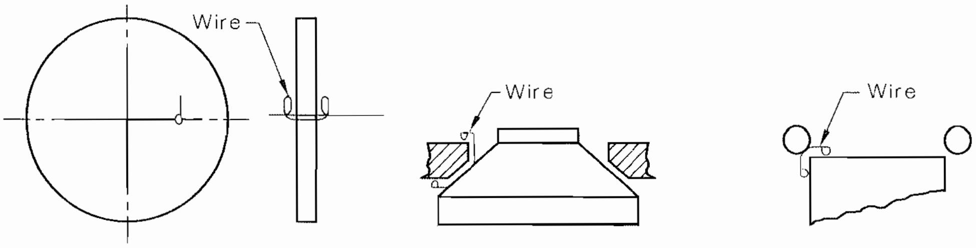
NOTE: Smaller devices, down to DN 6, will require the manufacturer's instruction on wire sizes.

The fouling wire should be held securely in the positions as illustrated in Figures C1 and C2.

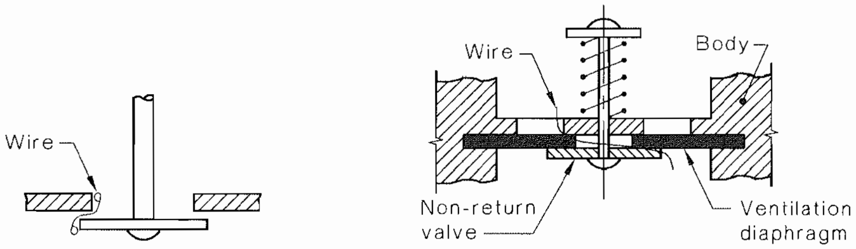
TABLE C1

FOULING WIRE DIAMETERS

Nominal size of device DN	Size of fouling wire mm
Up to 20	0.8
25	1.25
32	1.4
40	1.6
50	2.0
65	2.24
80	2.8
100	3.55
150	5.6
200	6.3
250	7.1

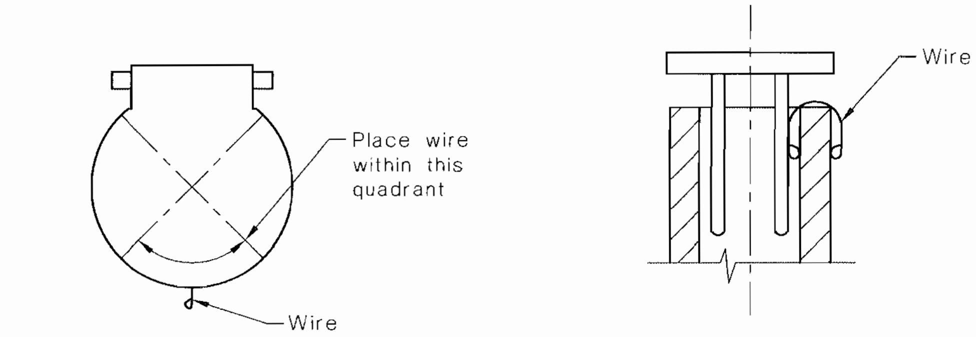


(a) Slotted disc (b) Bevel seat (c) O-ring seat

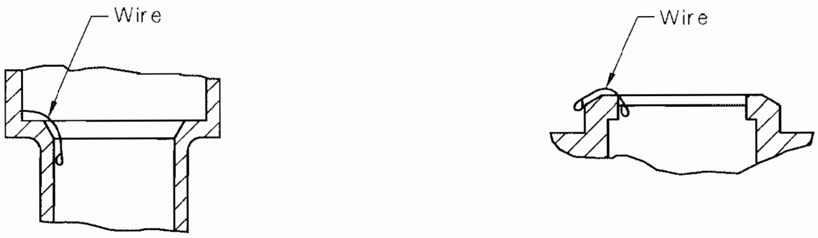


(d) Flat disc and seat (e) Diaphragm and seat

FIGURE C1 PLACEMENT OF FOULING WIRE IN HOSE CONNECTION VACUUM BREAKERS



(a) Swung disc non-return valve (b) Poppet type—nozzle type body



(c) Poppet type—flat or bevel seat body

FIGURE C2 PLACEMENT OF FOULING WIRE FOR OTHER THAN HOSE CONNECTION VACUUM BREAKERS

C1.10 Tolerances

Except where otherwise specified in this Standard, the following testing tolerances shall apply:

(a)	Pressure	+5, −0%.
(b)	Temperature	+5, −0%.
(c)	Bending moment	+2, −0 Nm.
(d)	Time	+60, −0 s.
(e)	Flow rate	+5, −0%.
(f)	Number of cycles	+5, −0%.
(g)	Torque	+5, −0 Nm.

C2 TESTING SEQUENCE

All devices shall be tested in accordance with the test sequence shown in Table C2, Appendix C.

TABLE C2

TYPE TESTING PROCEDURE MATRIX*

AVB	HCVB	DCAP	Dual CV	Du CV	PVB	DCV	DCDA	RPZD	RPDA	SPVB	BDDC	PID	SCVT	SCDAT
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
D	F^3	D	D	D	D	D	D	D	D	D	D	D	E^1	E^1
F^3	N	E^1	E^1	E^1	E^1	E^1	E^1	E^1	E^1	E^1	F^3	H	F^3	F^3
H	O	F^3	F^3	F^3	F^3	F^3	F^3	F^3	F^3	F^3	U		G	G
I	P	G	G	U	U	G	G	G	G	U	V		U	U
K	Q	U	U	K	EE	U	U	U	U	EE	W		K	Note 8
L	R	V	K	N	H	K	Note 6	GG	GG	QQ	X		CC	CC
M	S	W	CC	DD	I	CC	CC	HH	HH	H	RR		U^5	U^5
J	T	X	U^5	CC	K	U^5	U^5	II	II	I	K			
I^5	R^5	R	K^5	U^5	M			JJ	JJ	K	E			
PP	S^5	Y		DD^5	FF			KK	KK	M	SS			
		K			U^5			LL	LL	PP	F^5			
		AA			EE^5			K	Note 7	FF	U^5			
		BB			I^5			MM	MM	U^5	V^5			
		U^5			PP			NN	NN	EE^5	W^5			
		X^5						OO	OO	QQ^5	X^5			
		R^5						G^5	G^5	I^5				
		Y^5						U^5	U^5					
								GG^5	GG^5					
								KK^5	KK^5					

* Refer to Appendices, as set out

NOTES TO TABLE C2:

1 Heated water devices only.

2 Plastics-bodied devices shall be exposed to ultraviolet rays in accordance with ISO 4892-3.

3 Plastics-bodied devices should comply with Appendix TT.

4 If not already conducted (i.e., cold water devices).

5 Repeat tests to be conducted after endurance test.

6 DCDA shall, in addition, be tested to Appendix F of AS 2845.3—2009.

7 RPDA shall, in addition, be tested to Appendix E of AS 2845.3—2009.

8 SCDAT shall, in addition, be tested to Appendix E of AS 2845.3—2009.

NOTE: In New Zealand single check detector assemblies are not acceptable as backflow device.

C3 INSTRUMENTATION

C3.1 General

Where applicable, the accuracy of the instrumentation used in the tests required by this Standard shall be not less than that specified in Paragraphs C3.2 to C3.7. Tolerances for units that are to be measured are defined in Clause 1.5.

C3.2 Flow meter—For use with air

Accuracy:	±1% of full scale.
Response time:	<0.5 s.

C3.3 Flow meter—For use with water

Accuracy:	±1% of full scale.
Response time:	<1 s.

C3.4 Pressure devices—For use with air and water

All gauges shall be test gauges complying with AS 1349.

The reference pressure devices used for setting cut-out tolerances shall be a pressure gauge or alternative equipment (e.g. pressure transducer) accurate to ±1% of the true value.

NOTE: Digital or analogue pressure gauges which can be shown to provide indicating capabilities and accuracy characteristics of the same or a higher degree, may be used.

C3.5 Temperature-indicating device

Temperature range:	0°C to 150°C.
Accuracy:	±0.5% of full scale.
Response time:	1 s.

C3.6 Timing device

Accuracy:	±0.01 s.

C3.7 Sight glass

Internal diameter:	10 +0.5, −0 mm.

C3.8 Failure of device during testing

In the event of failure of the test rig, the readings on the counters shall be recorded and the test recommenced when the repairs have been made with the existing cycles recorded in credit.

In the event of any failures of the apparatus or interruptions during the test, the cause may be investigated and, if found to be due to contaminants, the readings on the counters shall be recorded and the test recommenced when the remedial action has been taken with the existing cycles recorded in credit.

APPENDIX D

TORQUE TEST ON SCREWED-IN END DEVICES

(Normative)

D1 SCOPE

This Appendix sets out the method for determining if the torque applied to a device during installation visibly distorts it.

D2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

D3 APPARATUS

The following apparatus is required:

(a) Torque wrench device complying with Paragraph C1.3, Appendix C.

(b) End connection adaptors.

(c) Means of securely clamping the adaptors.

D4 PROCEDURE

The procedure shall be as follows:

(a) Fit adaptors to each connection end of the device under test to support the thread form.

(b) Clamp the adaptors on the inlet or outlet side of the device, as appropriate, in the vice.

(c) Fit the jaws of the tension wrench to the wrench flats of the device furthest from the vice and apply the torque specified in Table D1 for a minimum of 10 s before releasing the load applied to the wrench.

(d) Repeat Step (c) to give a total of three applications.

(e) Remove all the adaptors.

(f) Remove and inspect the device.

TABLE D1

TORQUE TEST

Nominal size of inlet or outlet connection DN	Torque—Metallic-bodied devices Nm	Torque—Plastics-bodied devices Nm
6	25	5
8	30	10
10	40	15
15	50	20
20	75	30
25	90	40
32	105	60
40	115	75
50	135	100

D5 TEST REPORT

The following shall be reported.

(a) The manufacturer, model, size, and type of device.

(b) Any visible distortion to device or damage to threads.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix D.

APPENDIX E

TEST FOR ABILITY TO WITHSTAND CONTINUOUS PRESSURE—DEVICES INTENDED FOR HEATED WATER APPLICATIONS

(Normative)

E1 SCOPE

This Appendix sets out the method for determining the deterioration and distortion of rubber, plastics and other materials in devices subjected to heated water.

E2 TESTING TEMPERATURE

Measurements shall be taken at MOT.

E3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Temperature indicating device complying with Paragraph C3.5, Appendix C.

(c) Pressure gauge complying with Paragraph C3.4, Appendix C.

E4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position as illustrated in Appendix Z.

(b) Connect the device to the pressurizing system.

(c) Condition the device to MOT in accordance with Paragraph C1.8, Appendix C, and maintain at this temperature for the duration of the test.

(d) Raise the water pressure to 1.25 × AOP and maintain that pressure continuously for a minimum period of 8 h in any one day and for a total of 80 h.

(e) Retest hose connection vacuum breakers for backflow in accordance with Appendix Q.

(f) Retest dual check devices with atmospheric port for ventilation device opening pressure in accordance with Appendix X.

(g) Retest the devices for back-siphonage in accordance with Appendix R.

E5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) For a hose connection vacuum breaker, any backflow or back-siphonage through the device.

(c) For a dual check device with atmospheric port, the inlet and outlet pressures at which water begins to discharge from the ventilation device and any back-siphonage through the device.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix E.

APPENDIX F

POSITIVE PRESSURE TEST

(Normative)

F1 SCOPE

This Appendix sets out the method for positive pressure testing of backflow prevention devices designed for cold water applications. Plastics-bodied devices that meet the requirements of Appendix TT are not required to undergo this test.

F2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

F3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Temperature indicating device complying with Paragraph C3.5, Appendix C.

F4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position.

(b) Purge the device of air and apply 1.25 × AOP hydrostatic test pressure at the inlet. Maintain this pressure for not less than 5 min.

F5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The presence or absence of any leakage or distortion.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix F.

APPENDIX G

REVERSE PRESSURE TEST

(Normative)

G1 SCOPE

This Appendix sets out the method for determining the reverse pressure performance of the following devices:

(a) Non-return valves in double check valves (DCV) and double check detector assemblies (DCDA).

(b) Non-return valves in dual check valves.

(c) Downstream non-return valves in reduced pressure zone devices (RPZD) and reduce pressure detector assemblies (RPDA).

(d) Downstream non-return valves in dual check valves with atmospheric port.

(e) Non-return valve in single check valves (testable) (SCVT) and single check detector assemblies (testable) (SCDAT).

G2 TESTING TEMPERATURE

Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

Devices designed for use in cold and heated water shall be tested up to and at their nominated MOT.

G3 APPARATUS

The following apparatus complying with Appendix C, is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Timing device complying with Paragraph C1.4, Appendix C.

G4 PROCEDURE

This test shall be carried out individually on each non-return valve.

The procedure shall be as follows:

(a) Mount the valve in its normal working position.

(b) Condition the device in accordance with Paragraph C1.8, Appendix C, and maintain this temperature for the duration of the test.

(c) Reduce the pressure upstream of the non-return valve under test to atmospheric pressure.

(d) Raise the pressure downstream of the non-return valve to hydraulic test pressure of 1.5 × AOP and hold for not less than 5 min and observe for leakage.

G5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The presence or absence of any leakage or distortion.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix G.

APPENDIX H

AIR PORT OPENING AREA TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB), SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB) AND PIPE INTERUPTER DEVICE (PID)

(Normative)

H1 SCOPE

This Appendix sets out the method for determining whether the volume rate of airflow through the air ports to the water outlet is equal to or greater than the volume rate of airflow through the water inlet to the water outlet under equal vacuum conditions.

This test applies to atmospheric vacuum breakers, pressure type vacuum breakers, spill-resistant vacuum breakers, and pipe interrupter devices.

H2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

H3 APPARATUS (see Figure H1)

The following apparatus is required:

(a) Two lengths of 300 ±20 mm of smooth bore pipe having a nominal size corresponding to the water inlet and outlet of the device.

(b) A quick-opening device.

(c) A vacuum tank.

(d) A timing device complying with Paragraph C3.6, Appendix C.

(e) A pressure (vacuum) gauge complying with Paragraph C3.4, Appendix C.

H4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position, with 300 ±20 mm lengths of pipe attached to the water inlet and water outlet.

(b) Connect the water outlet to a vacuum tank.

(c) With the non-return valve held fully open and the air valve held closed, reduce the vacuum in the tank from 85 kPa to 15 kPa below atmospheric pressure by operating a quick-opening device and timing the operation. Repeat the procedure three times and determine the average time (see Note 1).

(d) With the non-return valve held closed and the air valve held open, reduce the vacuum in the tank as in Step (c). Repeat the procedure three times and determine the average time.

NOTES:

1 The time measured in Step (c) is inversely proportional to the volume rate of airflow through the water inlet to the water outlet.

2 The time measured in Step (d) is inversely proportional to the volume rate of airflow through the air ports to the water outlet.

3 If the time required in Step (c) is greater than that of Step (d), the device has passed the test.

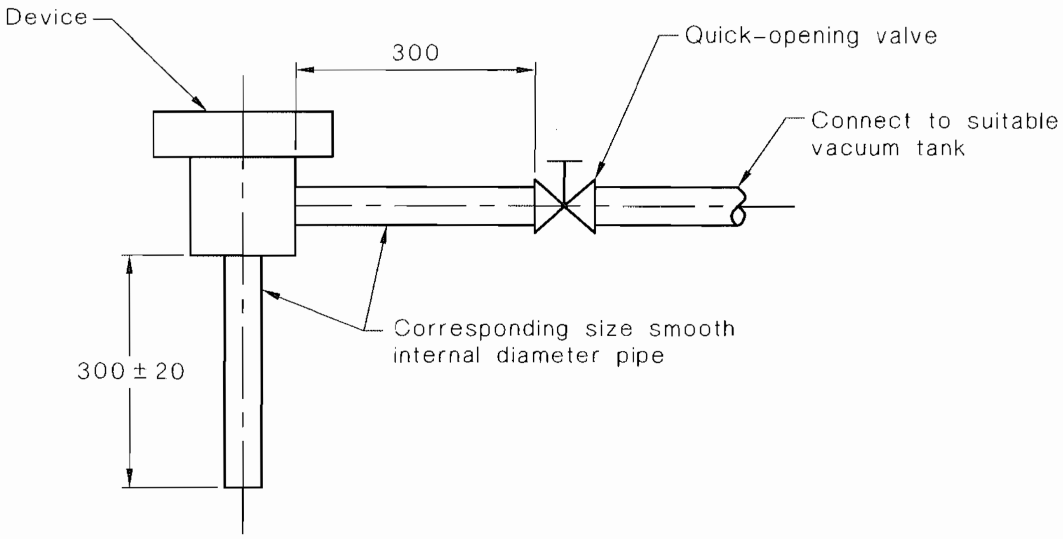
H5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size, and type of device.

(b) The average time to complete Steps (c) and (d).

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix H.


Device
300
Quick-opening valve
Connect to suitable vacuum tank
Corresponding size smooth internal diameter pipe
300 ± 20

DIMENSIONS IN MILLIMETRES

FIGURE H1 TYPICAL TEST ASSEMBLY—AIR PORT OPENING AREA

APPENDIX I

WATER RISE TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

(Normative)

I1 SCOPE

This Appendix sets out the method for determining the water rise in atmospheric vacuum breakers, pressure type vacuum breakers and spill-resistant pressure vacuum breakers.

I2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

I3 APPARATUS (see Figure I1)

The following apparatus is required:

(a) Fouling wire complying with Paragraph C1.9, Appendix C.

(b) Sight glass complying with Paragraph C1.5, Appendix C.

(c) Scale, graduated in millimetres.

(d) Vacuum tank.

(e) Reservoir of coloured water.

I4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position.

(b) Connect a vacuum tank to the water inlet.

(c) Connect a sight tube to the water outlet of the device, with its lower end submerged in water, the surface of which is the following distance below the critical level of the device:

  (i) Atmospheric vacuum breakers .... 150 mm.

  (ii) Pressure type vacuum breakers.. 300 mm.

(d) Foul the non-return valve or valves of the device using the supplied fouling wire.

(e) Conduct the following tests to obtain measurements under each set of conditions:

  (i) Apply a constant vacuum of not less than 85 kPa below atmospheric pressure for a period of not less than 30 s.

  (ii) Apply intermittent vacuums of 5, 15, 30, 50 and 85 kPa below atmospheric pressure. Each application shall be for 5 s on and 5 s off.

(f) Record height of water in sight glass.

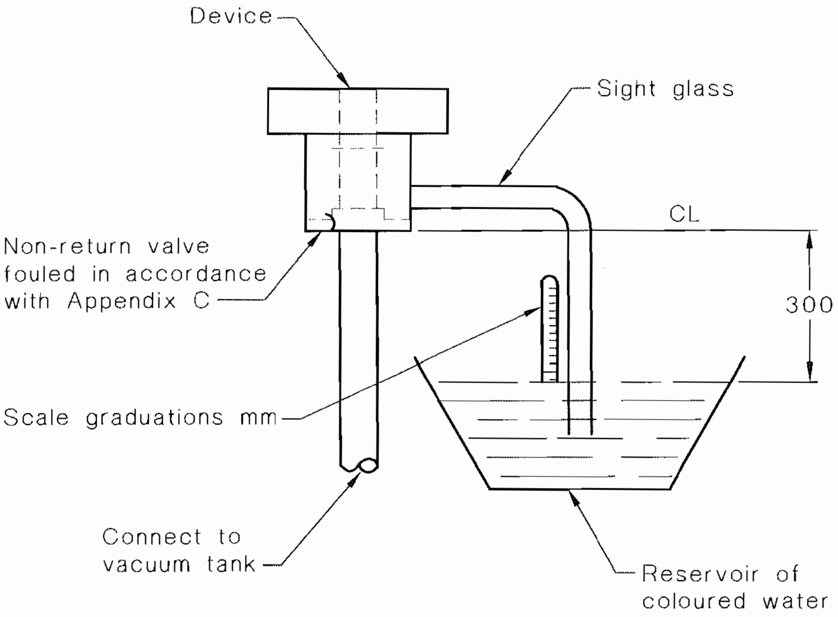
I5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The maximum elevation to which the water surface rises in the sight glass.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix I.


Device
Sight glass
CL
Non-return valve fouled in accordance with Appendix C
300
Scale graduations mm
Connect to vacuum tank
Reservoir of coloured water

DIMENSIONS IN MILLIMETRES

FIGURE I1 TYPICAL TEST ASSEMBLY—WATER RISE

APPENDIX J

ENDURANCE TEST—ATMOSPHERIC VACUUM BREAKER (AVB)

(Normative)

J1 SCOPE

This Appendix sets out the method for an endurance test for atmospheric vacuum breakers.

J2 TESTING TEMPERATURE

Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

Devices designed for use in cold and heated water shall be tested up to and at their nominated MOT.

J3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Test apparatus as specified in Appendix I.

(c) Counting device.

(d) Water hammer arresters.

J4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position.

(b) Connect the device to the pressurizing system.

(c) Condition devices designed for use in heated water at MOT (°C) in accordance with Paragraph C1.8, Appendix C, and maintain at this temperature for the duration of the test.

(d) Endurance:

  Apply 50 000 cycles as follows:

  (i) Slowly open inlet device and increase pressure from 0 kPa to AOP kPa, to inlet of device.

  (ii) Slowly close inlet device.

  Repeat for a total of 50 000 cycles at a rate not exceeding 10 cycles per minute with water at the required water temperature.

  During each cycle, the vent device and non-return valve shall move through their full extent of travel.

(e) Back-siphonage:

  Following the endurance test, test the device for protection against back-siphonage at temperature between 20°C and 40°C as follows:

  (i) Mount the device in its normal working position, with a test apparatus specified in Appendix I.

(ii) Pressurize the device to AOP (kPa) water pressure and maintain for a minimum of 5 s.

(iii) Release the water pressure upstream and downstream of the device then slowly apply a vacuum of 85 kPa to the inlet.

(iv) Repeat the test three times and observe the water rise in the sight tube beneath the device.

J5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Cycling temperature, in degrees Centigrade.

(c) The maximum elevation to which the water surface rises in the sight glass.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix J.

APPENDIX K

RATED FLOW AND PRESSURE LOSS TEST

(Normative)

K1 SCOPE

This Appendix sets out the method for determining the rated hydraulic flow capacity and pressure loss of—

(a) atmospheric vacuum breakers;

(b) double check valves;

(c) dual check valves;

(d) dual check valve with intermediate vent;

(e) pressure type vacuum breakers;

(f) reduced pressure zone devices;

(g) dual check valves with atmospheric port;

(h) beverage dispenser dual check valve with atmospheric vent;

(i) single check valves (testable); and

(j) spill-resistant pressure vacuum breakers.

K2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

K3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Flow meter complying with Paragraph C3.3, Appendix C.

(c) Pressure gauge complying with Paragraph C3.4, Appendix C.

K4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position, as illustrated in Appendix Z.

(b) Maintain a steady upstream pressure of at least 25% more than the maximum pressure loss of the device.

(c) Purge air from the system and then adjust the discharge valve until the minimum required rate of flow is reached, or the maximum allowable pressure loss is obtained. Record observed data.

(d) Adjust for pressure loss in piping between the gauges and the device on test.

K5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The rate of flow and pressure loss across the device.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix K.

APPENDIX L

VENTILATION VALVE LEAKAGE TEST—ATMOSPHERIC VACUUM BREAKER (AVB)

(Normative)

L1 SCOPE

This Appendix sets out the method for determining that the ventilation valve of an atmospheric vacuum breaker does not leak.

L2 TESTING TEMPERATURE

The device shall be tested at a temperature not exceeding 40°C.

L3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

L4 PROCEDURE

The procedure shall be as follows:

(a) Remove the air port shield and fit a stop device to the outlet of the test device and a needle valve to the inlet of the water supply line.

(b) Connect the water source to the inlet of the valve with a pressure gauge in the line upstream of the valve and downstream of the stop device controlling the water supply (see Appendix Z).

(c) Close the stop device on the outlet of the device.

(d) Fractionally open the needle valve on the water supply and observe when the ventilation valve has seated, with a zero reading on the pressure gauge.

(e) Close the needle valve and maintain these conditions for at least 30 s.

(f) Open the needle valve slowly and over a period of at least 30 s, increase the pressure to AOP (kPa), observing the air port openings for leakage.

(g) Repeat for a total of three tests.

L5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP (kPa).

(c) Any leakage of water from the air ports.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix L.

APPENDIX M

DETERMINATION OF CRITICAL LEVEL—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

(Normative)

M1 SCOPE

This Appendix sets out the method for determining the critical level (CL) for atmospheric vacuum breakers, pressure type vacuum breakers and spill-resistant pressure vacuum breakers.

M2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

M3 APPARATUS (see Figure M1)

The following apparatus is required:

(a) Fouling wire complying with Paragraph C1.9, Appendix C.

(b) Transparent water trap.

(c) Quick-opening device.

(d) Vacuum tank.

(e) Reservoir of coloured water.

M4 PROCEDURE

The procedure shall be as follows:

(a) Foul the non-return valve or valves of the device using the supplied fouling wire.

(b) Mount the device in its normal working position inside the reservoir.

(c) Connect the vacuum tank, quick-opening device and moisture trap to the water inlet port of the device.

(d) Raise the water level to submerge the device so that all of its openings and surfaces are wetted.

(e) Lower the water level to 3 mm below the air ports.

(f) Conduct tests as follows:

  (i) To determine the CL:

    (A) Apply a vacuum of 85 kPa, which will initiate the lowering of the water level in the reservoir.

    (B) Observe and mark the level at which back-siphonage ceases. This will occur when water ceases to collect in the water trap (CL in Figure M1).

    The position marked will be the critical level and normally occurs at a position below the level of the device seat.

  (ii) The test the determined CL:

    (A) Adjust the water level in the reservoir to a position 25 mm below the CL.

(B) Quickly open and close the quick-opening device to apply a vacuum surge loading to the device, by varying the vacuum load from 0 to 85 to 0 kPa, to verify the position of the CL.

(C) Repeat the actions defined in Step (B) a total of 5 times and record the outcome.

The CL shall be marked on the device or in lieu of such marking, the lowest point of the device shall be considered the CL.

M5 REPORT

The following information shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The distance of the CL below the non-return device seat.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix M.

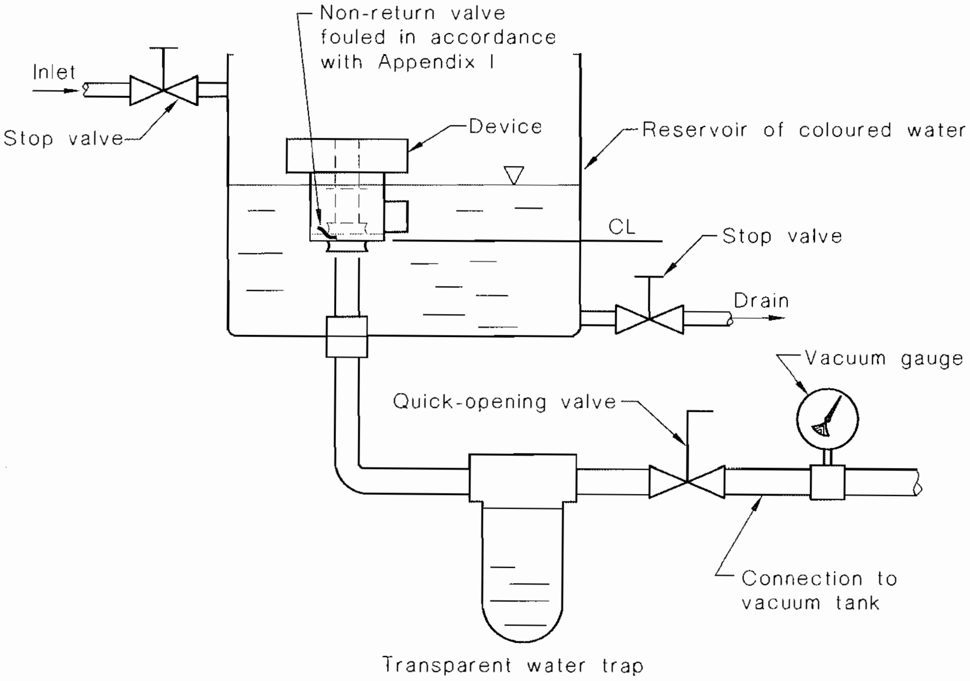

Non-return valve fouled in accordance with Appendix I
Inlet
Stop valve
Device
Reservoir of coloured water
CL
Stop valve
Drain
Vacuum gauge
Quick-opening valve
Connection to vacuum tank
Transparent water trap

FIGURE M1 TYPICAL TEST ASSEMBLY—CRITICAL LEVEL

APPENDIX N

TEST FOR LEAKAGE FROM AIR PORTS—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

(Normative)

N1 SCOPE

This Appendix sets out the method for determining the leakage at the air ports of hose connection vacuum breakers and dual check valves with intermediate vents.

N2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

N3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Flow meter complying with Paragraph C3.3, Appendix C.

(d) Upstream and downstream isolating devices.

N4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position.

(b) Close the downstream valve, 'crack' open the upstream valve very slowly and raise the upstream pressure to the point at which leakage ceases.

Note the pressure at which the highest rate of leakage occurs, adjust the upstream pressure to this pressure and measure the rate of leakage flow.

(c) Raise the upstream pressure to 20 kPa for HCVB and 70 kPa for Du CV and observe for leakage from the air ports.

N5 TEST REPORT

The following shall be reported.

(a) The manufacturer, model, size and type of device.

(b) The maximum leakage flow rate from the air ports and the presence or absence of leakage when the upstream pressure is applied.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix N.

APPENDIX O

TEST FOR RESISTANCE TO BENDING—HOSE CONNECTION VACUUM BREAKER (HCVB)

(Normative)

O1 SCOPE

This Appendix sets out the method for determining the resistance to a bending moment on the inlet of hose connection vacuum breakers.

O2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

O3 APPARATUS

The following apparatus is required:

(a) A test apparatus capable of providing a bending moment of 35 Nm to the device (see Figure O1).

(b) A pressurizing system complying with Paragraph C1.1, Appendix C.

O4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the horizontal or vertical plane with the inlet end firmly fixed.

(b) Pressurize the device hydrostatically to AOP.

(c) Apply a bending moment of 35 Nm at the inlet and hold for 3 min.

O5 TEST REPORT

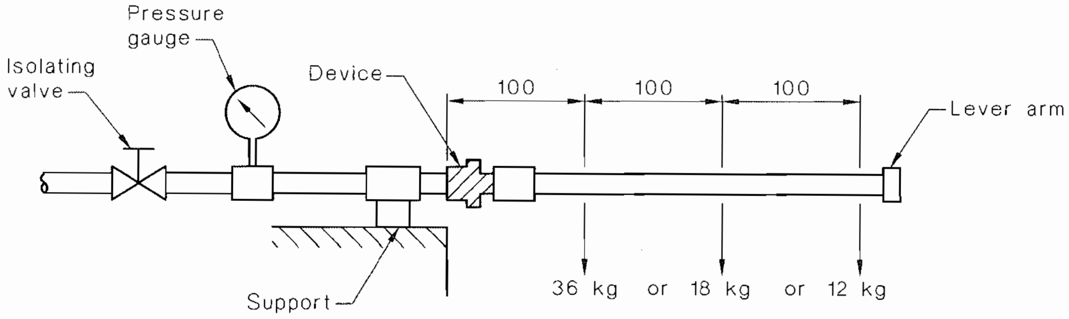
The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP, in kilopascals.

(c) Any sign of leakage during or after the bending test.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix O.



DIMENSIONS IN MILLIMETRES

FIGURE O1 TYPICAL TEST ASSEMBLY—RESISTANCE TO BENDING

APPENDIX P

TEST FOR RESISTANCE AND RELIEF OF BACKPRESSURE—HOSE CONNECTION VACUUM BREAKER (HCVB)

(Normative)

P1 SCOPE

This Appendix sets out the method for determining the ability of hose connection vacuum breakers to resist and relieve backpressure.

P2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

P3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) A minimum of 15 m of 12 mm hose.

(c) A quick-opening bleed device.

(d) A hose nozzle with a shut-off facility.

P4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position.

(b) Attach the quick-opening bleed device of the supply line to the device downstream of the control device.

(c) Attach the hose to the outlet of the device.

(d) Attach the hose nozzle to the downstream end of the hose.

(e) Open the supply line to the device and apply a pressure up to AOP.

(f) Open the nozzle to purge the hose of air and allow the nozzle to close slowly.

(g) Close the supply valve to the inlet of the device and then open the quick-opening bleed valve to reduce the pressure at the inlet of the device to zero.

P5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP in kilopascals.

(c) Pressure relief through the air ports.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix P.

APPENDIX Q

BACKPRESSURE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB)

(Normative)

Q1 SCOPE

This Appendix sets out the method for determining the backpressure performance of hose connection vacuum breakers.

Q2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

Q3 APPARATUS

The following apparatus is required:

(a) Sealing tape.

(b) Sight glass complying with Paragraph C1.5, Appendix C.

(c) Coloured water.

(d) Hose.

Q4 PROCEDURE

The procedure shall be as follows:

(a) Seal the air ports.

(b) Mount the device in a vertical working position with the outlet facing downwards.

(c) Connect the sight glass directly to the inlet of the device.

(d) Connect a hose to the outlet.

(e) Fill the hose with coloured water and raise the end of the hose to an elevation that will produce a 150 mm column of water at the lowest point of the outlet of the device.

(f) Hold the hose in this position for not less than 5 min and observe the sight glass for the presence of coloured water.

(g) Repeat the test with the water column increased by 600 mm increments until a 3 m column of water is reached.

Q5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any backflow from the device as indicated by the appearance of coloured water in the sight glass.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix Q.

APPENDIX R

TEST FOR BACK-SIPHONAGE—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

(Normative)

R1 SCOPE

This Appendix sets out the method for determining the back-siphonage performance of hose connection vacuum breakers and dual check valves with atmospheric port.

R2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

R3 APPARATUS

The following apparatus is required:

(a) A vacuum tank.

(b) Fouling wire complying with Paragraph C1.9, Appendix C.

(c) A sight glass complying with Paragraph C3.7, Appendix C.

(d) Reservoir of coloured water.

R4 PROCEDURE

The procedure shall be as follows:

(a) For hose connection vacuum breakers, mount the device in its normal working position, with non-return valve fouled in accordance with Paragraph C1.9, Appendix C.

(b) For dual check valve with atmospheric port, mount the device in its normal working position, with the upstream non-return valve fouled in accordance with Paragraph C1.9, Appendix C and the downstream non-return valve held open by mechanical means.

(c) Connect the inlet of the device to the vacuum tank.

(d) Connect the sight glass directly to the outlet of the device.

(e) Submerge the lower end of the sight glass in a reservoir of coloured water positioned below the device.

(f) Gradually apply vacuum of 85 kPa below atmospheric pressure to the inlet of the device and observe any water rise in the sight glass.

(g) Apply the vacuum rapidly alternating between 0 kPa and 85 kPa below atmospheric pressure to create a surge in the line, and observe any water rise in the sight glass.

R5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any back-siphonage from the device, as indicated by the crown of the meniscus in the sight tube, rising more than 3 mm.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix R.

APPENDIX S

TEST FOR RATED WATER FLOW CAPACITY AND PRESSURE LOSS—HOSE CONNECTION VACUUM BREAKER (HCVB)

(Normative)

S1 SCOPE

This Appendix sets out the method for determining the maximum pressure loss at rated flow across hose connection vacuum breakers.

S2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

S3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Flow meter complying with Paragraph C3.3, Appendix C.

(c) Pressure gauges complying with Paragraph C3.4, Appendix C.

S4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position, as illustrated in Figure Z1, Appendix Z.

(b) Connect the system to the water supply and maintain the required pressure at the inlet of the device during the test.

(c) Conduct tests as follows:

  (i) 175 kPa test:

    (A) Apply and maintain a pressure of 175 kPa at the inlet of the device.

    (B) Gradually open the downstream valve until a rate of flow specified in Table 5.1 is obtained, or the 175 kPa pressure differential is reached.

  (ii) AOP test:

    (A) Apply and maintain the AOP at the inlet of the device.

    (B) Gradually open the downstream valve until a rate of flow specified in Table 5.1 is obtained, or the 175 kPa pressure differential is reached.

S5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP kPa.

(c) The values observed for the rate of flow and pressure loss across the device.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix S.

APPENDIX T

ENDURANCE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB)

(Normative)

T1 SCOPE

This Appendix sets out the method for checking the endurance of hose connection vacuum breakers.

T2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

T3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Hose device.

(c) Bleed device.

(d) A minimum of 15 m of 12 mm hose.

(e) Counting device.

T4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal operating position in the test apparatus. Connect the hose to the outlet of the device.

(b) Connect test control valves as follows:

  (i) Close valve on the downstream end of the hose.

  (ii) Bleed valve immediately upstream of the device.

  (iii) Pressurize system valve upstream of the bleed valve.

(c) Subject the device to 50 000 cycles (at a rate not exceeding 10 cycles/min) as follows:

  (i) Close the bleed valve and open the supply and hose valves to permit water to flow through the device at the rated flow specified in Table 5.1.

  (ii) Close the hose valve and increase the hydrostatic pressure in the device to AOP (kPa).

  (iii) Close the system valve and open the bleed valve, allowing the pressure in the device to decrease to atmospheric pressure by discharging through the air ports.

(d) When the prescribed number of cycles is completed, retest the device for backpressure in accordance with Appendix Q and for back-siphonage in accordance with Appendix R without the non-return valve being fouled.

T5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP, in kilopascals.

(c) Any backflow or back-siphonage through the device.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix T.

APPENDIX U

NON-RETURN VALVE CLOSING PRESSURE TEST

(Normative)

U1 SCOPE

This Appendix sets out the method for determining the closing pressure required for the following devices:

(a) Non-return valve or valves in pressure type vacuum breakers.

(b) Non-return valves in double check valves.

(c) Downstream non-return valves in reduced pressure zone devices.

(d) Non-return valves in dual check valves with atmospheric port.

(e) Non-return valves in dual check valves.

(f) Non-return valves in dual check valve with intermediate vent.

(g) Non-return valves in beverage dispenser dual check valve with atmospheric port.

(h) Non-return valves in single check valves.

(i) Non-return valves in spill-resistant pressure vacuum breakers.

U2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

U3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Sight glass complying with Paragraph C1.5, Appendix C.

(c) Isolating valves complying with Paragraph C1.6, Appendix C.

(d) Test taps.

(e) Means to seal the relief valve vent of reduced pressure zone devices where applicable.

U4 PROCEDURE

This test shall be carried out individually on each non-return device.

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Attach the water supply to the inlet and the sight glass to a test tap upstream of the non-return valve under test (see Figure U1).

(c) For a reduced pressure zone device, dual check valve with intermediate vent and dual check valve with atmospheric port, seal the port.

(d) For testing the upstream non-return valve, hold open the downstream non-return valve by some suitable means.

(e) For testing the downstream non-return valve, hold open the upstream non-return valve by some suitable means.

(f) Close the test tap to which the sight glass is connected.

(g) Open the downstream isolating valve and slowly open the upstream isolating valve until a flow rate of 10% of the applicable rated capacity of the device under test is obtained.

(h) Under flow conditions, slowly open the test tap to which the sight glass is connected and allow the sight glass to fill to a level of at least 1200 mm.

(i) Close the upstream isolating valve and fully open the test tap to which the sight glass is connected.

(j) Observe and record the water level in the sight glass after 30 ±5 min.

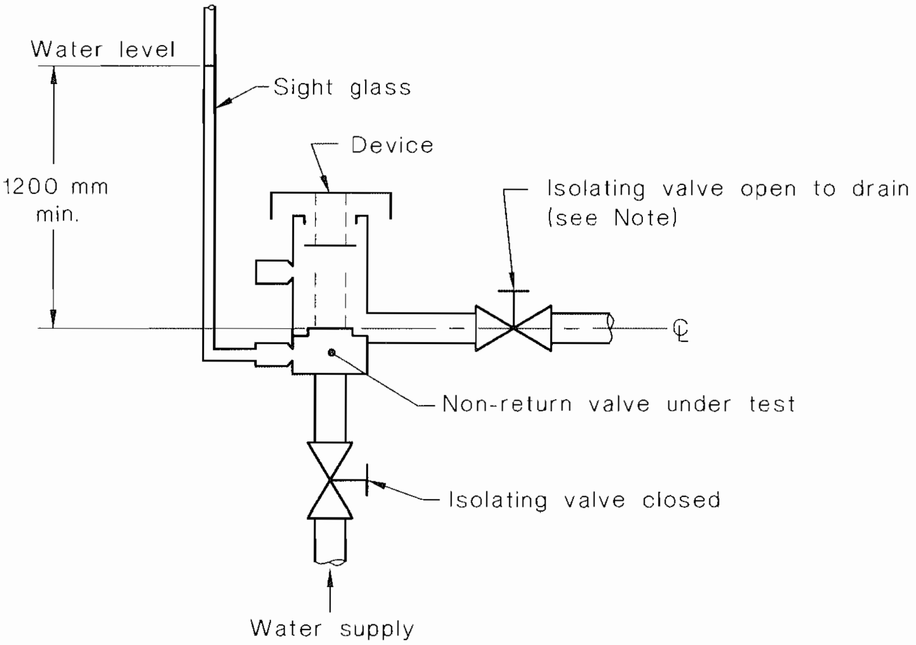
U5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any leakage past the non-return valve as indicated by the sight glass.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix U.



NOTE: To be within ±10 mm of valve under test.

FIGURE U1 TYPICAL TEST ASSEMBLY— NON-RETURN VALVE CLOSING PRESSURE TEST

APPENDIX V

TEST FOR LEAKAGE FROM AIR PORTS—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

(Normative)

V1 SCOPE

This Appendix sets out the method for determining the leakage from the air ports of dual check valve with atmospheric port and beverage dispenser dual check valves with atmospheric port.

V2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

V3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauges complying with Paragraph C3.4, Appendix C.

(c) Isolating devices complying with Paragraph C1.6, Appendix C.

V4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) With the discharge valve opened slightly, open the supply valve slowly until the pressure at the inlet of the device is at 70 kPa.

(c) Repeat the test again by opening the supply device rapidly.

(d) Repeat the test with the AOP (kPa) for the device.

(e) Close the discharge valve, open the supply valve fully and gradually open the discharge valve until the flow through the device is approximately the rated flow.

V5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP, in Kilopascals.

(c) The presence or absence of leakage during the tests.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix V.

APPENDIX W

TEST FOR BACKFLOW THROUGH UPSTREAM NON-RETURN VALVE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

(Normative)

W1 SCOPE

This Appendix sets out the method for determining the reverse pressure performance of the upstream non-return valve of dual check valve with atmospheric port and beverage dispenser dual check valve with atmospheric port.

W2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

W3 APPARATUS

The following apparatus is required in accordance with Appendix C:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C, or sight glass complying with Paragraph C1.5, Appendix C.

W4 PROCEDURE

The procedure shall be as follows:

(a) Hold the downstream non-return valve open by some suitable means and seal the air port outlets.

(b) Connect the pressurizing system and the sight glass or pressure gauge to the outlet of the device (see Figure W1).

(c) Raise the downstream pressure to 150 mm of water and hold for 5 min.

(d) Repeat the test with the pressure at the outlet at 100 kPa and in 250 kPa increments until finally at AOP (kPa).

W5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP, in kilopascals.

(c) Any leakage to the inlet through the non-return device.

(d) Reference to this test method, i.e., AS /NZS 2845.1, Appendix W.

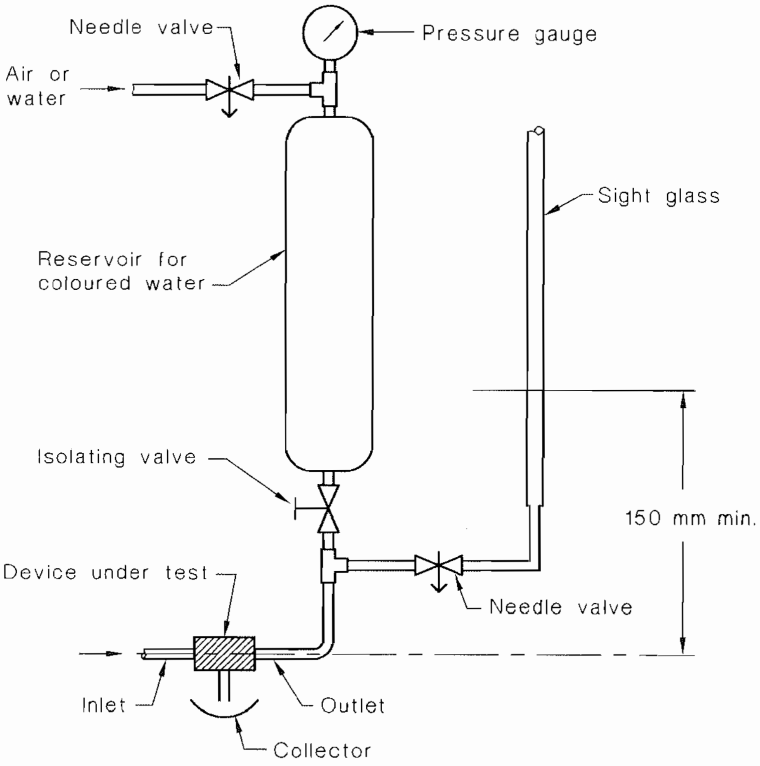


FIGURE W1 TYPICAL TEST ASSEMBLY—DCAP AND BDDC

APPENDIX X

VENTILATION VALVE OPENING PRESSURE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

(Normative)

X1 SCOPE

This Appendix sets out the method for determining the pressure at which the ventilation valve opens when the device is subjected to backpressure.

X2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

X3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauges complying with Paragraph C3.4, Appendix C.

X4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position.

(b) Hold open the downstream non-return valve by some suitable means.

(c) Purge the system of air and pressurize it to 200 kPa under static condition.

(d) Slowly bleed the supply pressure and note the pressure difference between the supply and downstream pressure when water begins to discharge from the ventilation device.

(e) Repeat the test at 500 kPa and AOP (kPa).

X5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) AOP (kPa).

(c) The upstream and downstream pressures at which water begins to discharge from the ventilation valve.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix X.

APPENDIX Y

TEST FOR BACK-SIPHONAGE UNDER BACKPRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

(Normative)

Y1 SCOPE

This Appendix sets out the method for determining the back-siphonage performance of dual check valve with atmospheric port under conditions of backpressure.

Y2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

Y3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Fouling wire complying with Paragraph C1.9, Appendix C.

(c) Water trap.

(d) Quick-opening device.

(e) Vacuum tank.

(f) Pressure and vacuum devices complying with Paragraph C3.4, Appendix C.

Y4 PROCEDURE

The procedure shall be as follows:

(a) Foul the upstream non-return valve with fouling wire in accordance with Paragraph C1.9, Appendix C.

(b) Install the device with the vacuum tank quick-opening device and water trap connected to the inlet and with the pressurizing system connected to the outlet.

(c) With a backpressure of 100 kPa, gradually apply a vacuum up to 85 kPa below atmospheric pressure to the inlet of the device and observe any flow of water from the inlet of the device into the water trap.

(d) With the backpressure remaining at 100 kPa, apply the vacuum, rapidly alternating between 0 kPa and 85 kPa below atmospheric pressure, to create a surge in the line, and observe any flow of water from the inlet of the device into the water trap.

(e) Repeat Steps (c) and (d) at 350 kPa backpressure.

(f) With the downstream non-return valve fouled with the fouling wire, and with the upstream non-return valve in its normal closed position, repeat Steps (c), (d) and (e).

Y5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any flow of water from the inlet of the device into the water trap.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix Y.

APPENDIX Z

TESTING INSTALLATION FOR TESTS OF APPENDICES E, F, K, L, M, S AND AA

(Normative)

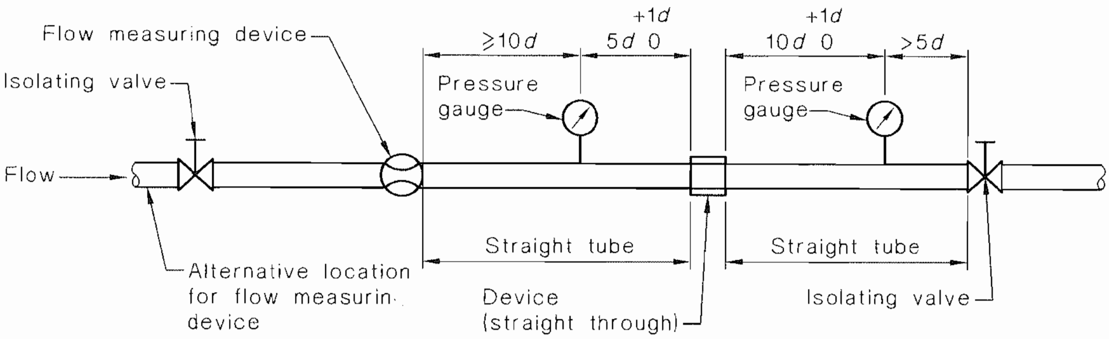
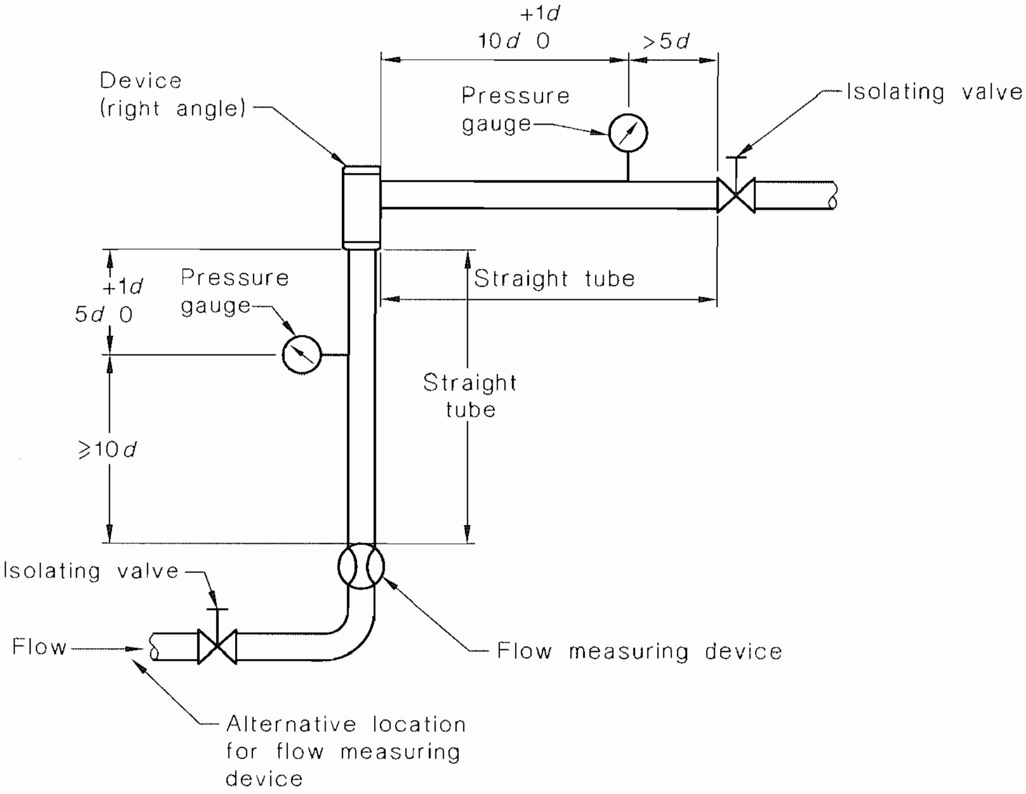


FIGURE Z1 INSTALLATION—ARRANGEMENT A



NOTE: Use corresponding diameter tube to diameter of device.

FIGURE Z2 INSTALLATION—ARRANGEMENT B

APPENDIX AA

TEST FOR FLOW RATE AT LOW SUPPLY PRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

(Normative)

AA1 SCOPE

This Appendix sets out the method for determining the flow rate through a dual check valve with atmospheric port when the supply pressure is 70 kPa.

AA2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

AA3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Flow meter complying with Paragraph C3.2, Appendix C.

(c) Pressure gauges complying with Paragraph C3.4, Appendix C.

AA4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position, as illustrated in Appendix Z.

(b) Purge the system of air.

(c) Gradually open the supply valve until the pressure differential across the device reaches 70 kPa.

AA5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The flow through the device when the pressure differential reaches 70 kPa.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix AA.

APPENDIX BB

ENDURANCE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)

(Normative)

BB1 SCOPE

This Appendix sets out the method for an endurance test for dual check valve with atmospheric port.

BB2 TESTING TEMPERATURE

Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

Devices designed for use in cold and heated water shall be tested up to and at their nominated MOT.

BB3 APPARATUS

A pressurizing system complying with Paragraph C1.1, Appendix C, shall be used.

BB4 PROCEDURES

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position.

(b) Connect the device to the pressurizing system.

(c) Condition devices designed for use in heated water at MOT in accordance with Paragraph C1.8, Appendix C and maintain at this temperature for the duration of the test.

(d) Test for 50 000 cycles at the appropriate temperature at a rate not exceeding 10 cycles per min of alternating flow through the device at zero to rated flow in accordance with Table 7.1.

(e) At the conclusion of the prescribed number of cycles, retest the device at a temperature between 20°C and 40°C for—

  (i) non-return valve closing pressure in accordance with Appendix U;

  (ii) ventilation valve opening pressure in accordance with Appendix X;

  (iii) back-siphonage in accordance with Appendix R; and

  (iv) back-siphonage under backpressure in accordance with Appendix Y.

BB5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Cycling temperature, in degrees Centigrade.

(c) Any back-siphonage.

(d) Non-return valve closing pressure.

(e) Ventilation valve opening pressure.

(f) Reference to this test method, i.e., AS/NZS 2845.1, Appendix BB.

APPENDIX CC

ENDURANCE TEST—DOUBLE CHECK VALVE (DCA), DUAL CHECK VALVE (Dual CV), DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV), DOUBLE CHECK DETECTOR ASSEMBLY (DCDA), SINGLE CHECK VALVE (TESTABLE) (SCVT) AND SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)

(Normative)

CC1 SCOPE

This Appendix sets out the method of performing an endurance test for double check valve, dual check valve, dual check valve with intermediate vent, single check valve (testable) and single check detector assembly (testable).

CC2 TESTING TEMPERATURE

Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

Devices designed for use in cold and heated water shall be tested up to and at their nominated MOT.

CC3 APPARATUS

A pressurizing system complying with Paragraph C1.1, Appendix C, shall be used.

CC4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position.

(b) Connect the device to the pressurizing system.

(c) Condition devices designed for use in heated water at MOT not exceeding the tolerance specified in Paragraph C1.10(b), Appendix C, and maintain at this temperature for the duration of the test.

(d) At a rate nominated by the manufacturer but not exceeding 10 cycles per minute, subject the device to an alternating flow through the assembly between zero and the rated flow in accordance with the following requirements:

   (i) Double check valve .... Table 10.1.

   (ii) Dual check valve .... Table 7.1.

   (iii) Dual check devices with intermediate vent .... 0.25 L/s.

   (iv) Single check valve (testable).. Table 17.1.

   (v) Single check detector assembly (testable)..................................... Table 17.1.

   (vi) Double check detector assembly .... Table 10.1.

   Test the devices for 50 000 cycles at the appropriate temperature.

   At zero flow through the device during each cycle, the downstream non-return valve shall be submitted to a backpressure of 400 +10, −0 kPa.

The backpressure is developed by in-sequence pressurizing the upstream to the device and draining the upstream of the device to atmospheric pressure. The backpressure shall be maintained for a minimum of 2 s during each cycle.

(e) At the conclusion of the required number of cycles, retest the device in accordance with Appendix U at a temperature between 20°C and 40°C.

CC5 REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Cycling temperature, in degrees Centigrade.

(c) Any leakage through the non-return valve.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix CC.

APPENDIX DD

BACK-SIPHONAGE TEST—DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)

(Normative)

DD1 SCOPE

This Appendix sets out the method for determining the back-siphonage performance of a dual check valve with intermediate vent.

DD2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

DD3 APPARATUS

The following apparatus is required:

(a) Test rig in accordance with Figure DD1.

(b) Coloured water at ambient room temperature.

(c) Vacuum tank and generator.

(d) Vacuum gauge.

(e) Vacuum regulators.

(f) Isolating devices complying with Paragraph C1.6, Appendix C.

(g) Sight glass complying with Paragraph C1.5, Appendix C.

(h) Reservoir (water).

(i) Water trap with drain.

DD4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test rig (see Figure DD1).

(b) Position the reservoir of coloured water (10) so that the end of the sight glass (9) is immersed not less than 40 mm, or more than 60 mm in the water.

(c) Open isolating valves (4), (5) and (6) and quick-opening device (8).

(d) Start the vacuum generator (1) and operate the vacuum regulator (7) to apply a vacuum of 60 kPa as evidenced on vacuum gauge (3).

(e) Apply this vacuum for 5 ±0.2 min.

(f) Observe and record the presence or absence of coloured water in the water trap (12). If water is present, discontinue the test.

(g) Switch off the vacuum generator (1) and return the upstream side of the pipework to atmospheric.

(h) Remove the device and foul both non-return valves in accordance with Paragraph C1.9, Appendix C.

(i) Replace the device in the test rig.

(j) Repeat Steps (d) to (f).

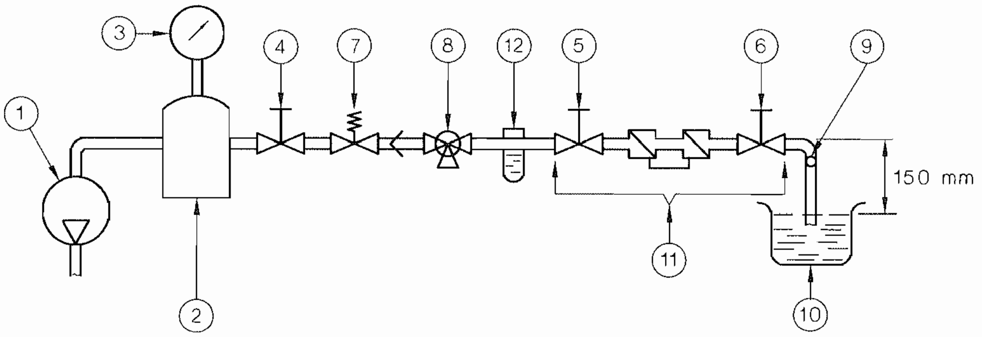
DD5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, type and size of device.

(b) The presence or absence of coloured water in the transparent trap after Steps (d) to (f).

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix DD.



NOTE: All pipework and fittings between the vacuum tank and the test device have to be of the same nominal size as the test device.

FIGURE DD1 TYPICAL TEST RIG FOR BACK-SIPHONAGE TEST—Du CV

APPENDIX EE

VENTILATION VALVE OPENING PRESSURE TEST—PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

(Normative)

EE1 SCOPE

This Appendix sets out the method for determining whether the ventilation valve in pressure type vacuum breakers and spill-resistant pressure vacuum breakers starts to open when the pressure falls to not less than 7 kPa and is fully open when the pressure is at atmospheric.

EE2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

EE3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Sight glass complying with Paragraph C1.5, Appendix C.

EE4 PROCEDURE

EE4.1 Pressure type vacuum breaker and spill-resistant pressure vacuum breaker

The procedure shall be as follows:

(a) Mount the device in its normal operating position with the sight glass connected to the downstream test tap (see Figure EE1).

(b) Remove the air vent protective shield to expose the device for observation.

(c) Open the test tap to which the sight glass is connected and pressurize the system to more than 700 mm water column, measured from the vent seat to water level in the sight glass.

(d) Slowly drain water from the system. When the vent valve starts to open, close the downstream test tap. Observe level in sight glass.

(e) Drain the water from the downstream chamber through the outlet of the device.

EE4.2 Vacuum breaker check device

The procedure shall be as follows:

(a) Mount the device in its normal operating position with the sight glass connected to the inlet of the device and the outlet open. Hold the check valve closed by closing the tap.

(b) Remove the air vent protective shield to expose the ventilation valve for observation.

(c) Open the isolating valve to which the sight glass is connected and pressurize upstream of the check valve to more than 700 mm water column, measured from the ventilation valve seat to the water level in the sight glass.

(d) Slowly drain water from upstream of the check valve. When the ventilation valve starts to open, stop draining and observe the level in the sight glass.

(e) Drain all the water from upstream of the check valve and observe the position of the ventilation device.

EE5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Level of water in sight glass.

(c) Whether vent device is fully open.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix EE.

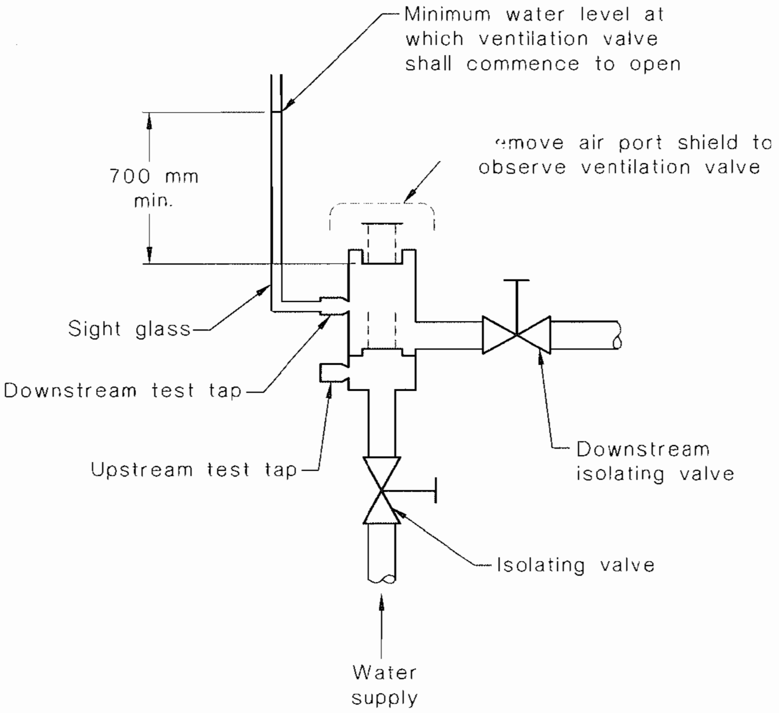

Minimum water level at which ventilation valve shall commence to open
Remove air port shield to observe ventilation valve
700 mm min.
Sight glass
Downstream test tap
Upstream test tap
Downstream isolating valve
Isolating valve
Water supply

FIGURE EE1 TYPICAL ASSEMBLY FOR VENTILATION VALVE OPENING PRESSURE TEST—PVB AND SPVB

APPENDIX FF

ENDURANCE TEST—PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

(Normative)

FF1 SCOPE

This Appendix sets out the method for an endurance test for pressure type vacuum breakers and spill-resistant pressure vacuum breakers.

FF2 TESTING TEMPERATURE

Cold water devices suitable for operation up to 40°C shall be tested at a temperature not exceeding 40°C.

Devices designed for use in cold and heated water shall be tested up to and at their nominated MOT.

FF3 APPARATUS

A pressurizing system complying with Paragraph C1.1, Appendix C, shall be used.

FF4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in the test system in its normal working position.

(b) Connect the device to the pressurizing system.

(c) Condition devices designed for use in heated water at MOT in accordance with Paragraph C1.8, Appendix C, at the maximum tolerance specified in Paragraph C1.10(b), Appendix C, and maintain at this temperature for the duration of the test.

(d) At a rate nominated by the manufacturer, but not exceeding 10 cycles per minute, apply alternating flow through the device from zero to the rated flow in accordance with the following:

    (i) Table 9.1 for PVB, test the device for 50 000 cycles.

    (ii) Table 14.1 for SPVB, test the device for 50 000 cycles.

    At the conclusion of the required number of cycles, retest the device at a temperature between 20°C and 40°C in accordance with Appendices U, EE and I for PVB, and Appendices U, EE, QQ and I for APVB in accordance with Table C2, Appendix C.

FF5 REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Cycling temperature, in degrees Centigrade.

(c) Any leakage of the non-return valve or valves, failure of the vent valve to open or back-siphonage through the device.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix FF.

APPENDIX GG

INTERMEDIATE CHAMBER PRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

GG1 SCOPE

This Appendix sets out the method for determining the intermediate chamber pressure of reduced pressure zone devices and reduced pressure detector assemblies.

GG2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

GG3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Differential pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Isolating valves complying with Paragraph C1.6, Appendix C.

GG4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Connect the differential pressure gauge between the upstream chamber and the intermediate chamber of the device as shown in Figure GG1. Purge the system of air, including the differential pressure gauge lines.

(c) For the static test, close the downstream valves, then the upstream isolating valves, and observe and record the pressure difference between the upstream chamber and the intermediate chamber. After maintaining the static condition for 5 min, record the minimum pressure difference.

GG5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The minimum pressure difference during both flowing and static conditions.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix GG.

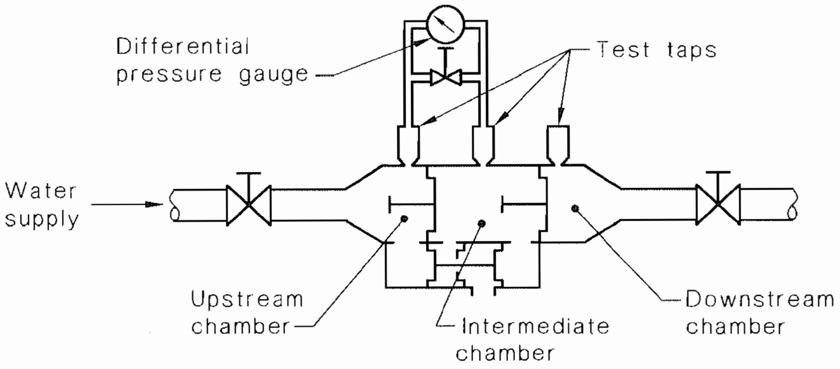


FIGURE GG1 TYPICAL ASSEMBLY FOR INTERMEDIATE CHAMBER PRESSURE TEST—RPDZ AND RPDA

APPENDIX HH

DETERMINATION OF SUPPLY PRESSURE AT WHICH PRESSURE IN THE INTERMEDIATE CHAMBER BECOMES ATMOSPHERIC—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

HH1 SCOPE

This Appendix sets out the method for determining the supply pressure at which the pressure in the intermediate chamber of a reduced pressure zone device or a reduced pressure detector assembly becomes atmospheric.

HH2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

HH3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Differential pressure gauge complying with Paragraph C3.4, Appendix C.

(d) Isolating valve complying with Paragraph C1.6, Appendix C.

HH4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Connect a pressure gauge to the intermediate chamber.

(c) Connect a drain to the upstream chamber in combination with a differential pressure gauge connected between the upstream chamber and the intermediate chamber (see Figure HH1).

(d) Hold open or remove downstream non-return valve.

(e) Close the downstream isolating valve and raise the pressure in the inlet to the device to approximately 200 kPa and maintain this pressure during the test.

(f) Close the upstream isolating valve then gradually reduce the pressure in the upstream chamber to open the relief device and allow water to discharge from the intermediate chamber to atmosphere.

(g) Record the pressure shown in the differential pressure gauge.

(h) Continue to reduce the upstream pressure until the pressure in the intermediate chamber is at atmospheric.

(i) Immediately close the drain tap.

HH5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The pressure recorded by the differential pressure gauge.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix HH.

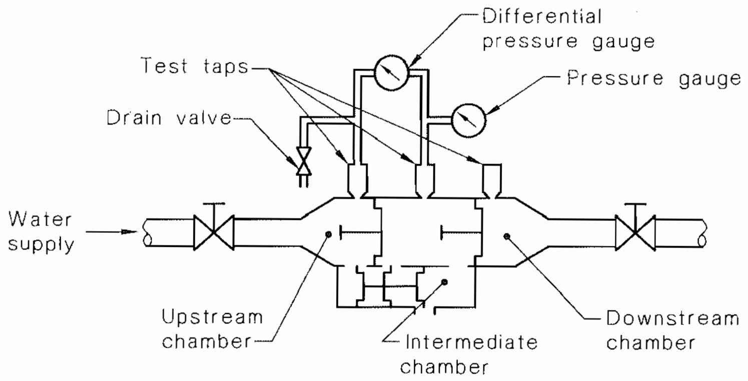


FIGURE HH1 TYPICAL TEST ASSEMBLY FOR SUPPLY PRESSURE AT WHICH PRESSURE IN THE INTERMEDIATE CHAMBER BECOMES ATMOSPHERIC—RPZD AND RPDA

APPENDIX II

DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS 14 kPa OR GREATER—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

II1 SCOPE

The Appendix sets out the method for determining the intermediate chamber pressure of a reduced pressure zone device or a reduced pressure detector assembly under backpressure conditions when the supply is 14 kPa or more.

II2 TESTING TEMPERATURE

Devices shall be tested at a temperature not exceeding 40°C.

II3 APPARATUS

The following apparatus is required:

(a) A pressurizing system complying with Paragraph C1.1, Appendix C.

(b) A supply of water to the outlet of the device, sufficient to achieve test flow rates.

(c) Pressure gauge complying with Paragraph C3.4, Appendix C.

(d) Differential pressure gauge complying with Paragraph C3.4, Appendix C.

(e) Flow meter complying with Paragraph C3.3, Appendix C.

II4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Connect a pressure gauge to the upstream chamber in combination with a differential pressure gauge connected between the upstream chamber and the intermediate chamber (see Figure II1).

(c) Hold open or remove the downstream non-return valve.

(d) Open the upstream isolating valve and purge the system of air.

(e) Increase the upstream pressure of the valve to 200 kPa, and maintain that pressure during the test.

(f) Supply water to the downstream of the device until the specified rate of flow from the relief valve is achieved.

(g) Record the pressure shown in the differential pressure gauge.

II5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The pressure in the upstream chamber of the device and the differential pressure between the upstream chamber and the intermediate chamber.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix II.

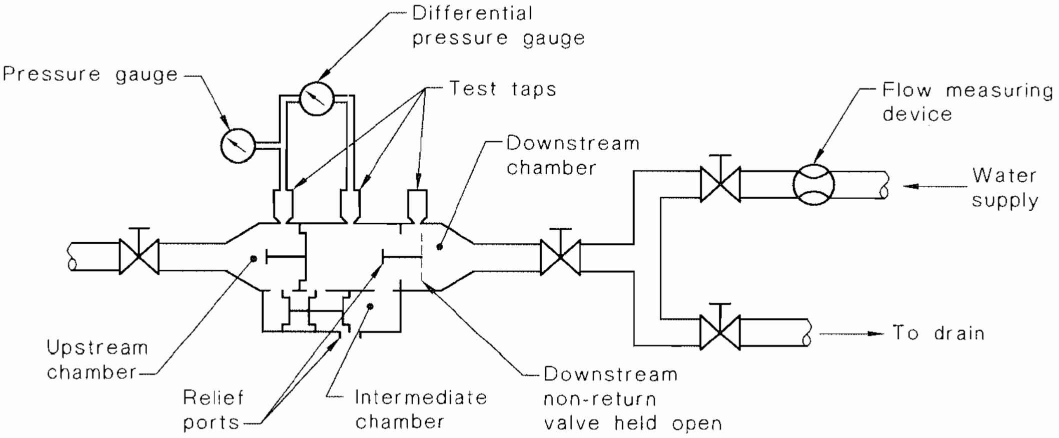


FIGURE II1 TYPICAL TEST ASSEMBLY FOR INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS 14 kPa OR MORE—RPZD AND RPDA

APPENDIX JJ

DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS LESS THAN 14 kPa—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

JJ1 SCOPE

This Appendix sets out the method for determining the intermediate chamber pressure of a reduced pressure zone device or a reduced pressure detector assembly under backpressure conditions when the supply pressure is less than 14 kPa.

JJ2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

JJ3 APPARATUS

The following apparatus is required:

(a) A supply of water at a minimum pressure of 200 kPa.

(b) Sight glass complying with Paragraph C1.5, Appendix C.

(c) Flow meter complying with Paragraph C3.2, Appendix C.

JJ4 PROCEDURE

This test may be carried out at the available water temperature.

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Connect a sight glass to the intermediate chamber of the device (see Figure JJ1).

(c) Hold the downstream non-return valve open by mechanical means and connect the downstream side of the device to a water supply, with means of measuring the flow rate.

(d) Allow the upstream pressure to fall to atmospheric pressure.

(e) Supply water at the downstream of the device until the specified rate of flow from the relief device is achieved.

(f) Record rise in water level in the sight glass.

JJ5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) The measured rise in water level in the sight glass.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix JJ.

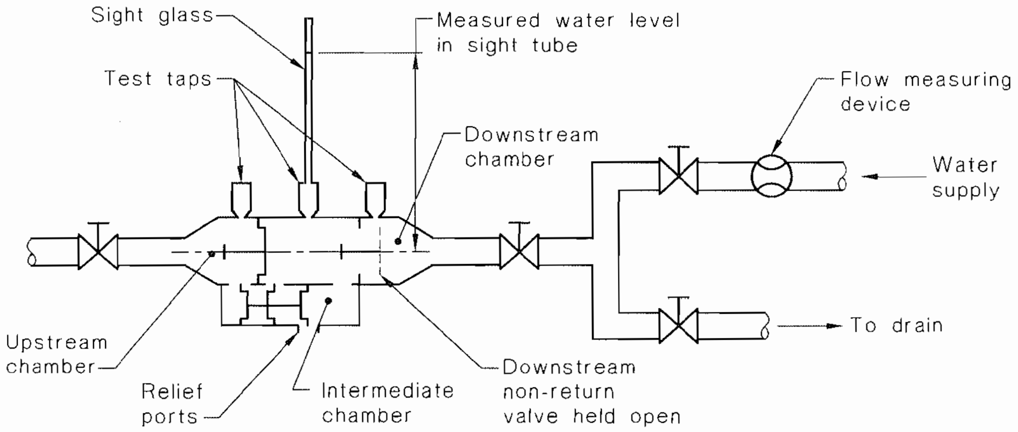


FIGURE JJ1 TYPICAL TEST ASSEMBLY FOR INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS LESS THAN 14 kPa—RPZD AND RPDA

APPENDIX KK

DETERMINATION OF PRESSURE DIFFERENTIAL AT WHICH RELIEF VALVE COMMENCES TO OPEN—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

KK1 SCOPE

This Appendix sets out the method for determining the differential pressure between the upstream and intermediate chambers at which the relief valve begins to open in reduced pressure zone devices and reduced pressure detector assemblies.

KK2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

KK3 APPARATUS

The following apparatus is required:

(a) A supply of water at a minimum pressure of 200 kPa.

(b) Bypass tube with needle device.

(c) Differential pressure gauge complying with Paragraph C3.4 Appendix C.

KK4 PROCEDURE

This test may be carried out at available water temperature.

The procedure shall be as follows:

(a) Install the device in its normal operating position. Connect a bypass with needle device in conjunction with a differential pressure gauge between the upstream chamber and the intermediate chamber (see Figure KK1).

(b) Purge the system of air and pressurize the device to 200 kPa.

(c) Open the needle valve slightly until the gauge shows a decreasing differential pressure.

(d) Observe the pressure differential at which the relief valve commences to open.

(e) Close the needle valve and open the water supply to restore the upstream pressure.

(f) Observe if the relief valve recloses tightly.

(g) Repeat Steps (b) to (f) in increments of 200 kPa up to and including 1400 kPa.

KK5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) At each value of supply pressure, the differential pressure at which the relief valve just commences to open and whether the relief valve recloses and remains drip-tight when the upstream pressure is restored.

(c) Reference to the test method, i.e., AS/NZS 2845.1, Appendix KK.

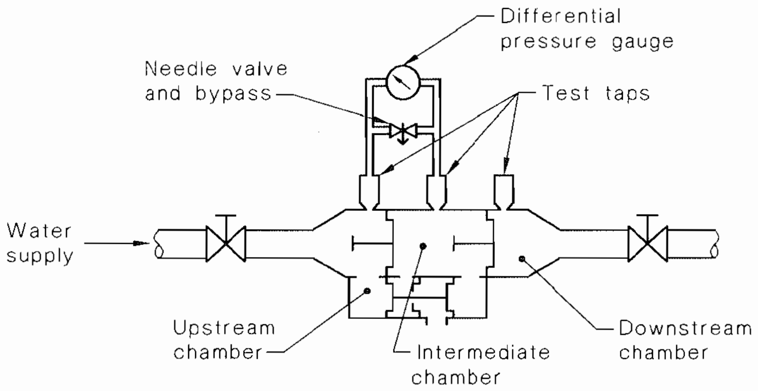


FIGURE KK1 TYPICAL TEST ASSEMBLY FOR PRESSURE DIFFERENTIAL AT WHICH RELIEF VALVE COMMENCES TO OPEN—RPZD AND RPDA

APPENDIX LL

TEST FOR EFFECT OF SUPPLY PRESSURE FLUCTUATION ON DISCHARGE FROM RELIEF VALVE—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

LL1 SCOPE

This Appendix sets out the method for determining the effect of supply pressure fluctuations on the discharge from the relief valve of reduced pressure zone devices and reduced pressure detector assemblies.

LL2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

LL3 APPARATUS

The following apparatus is required:

(a) A supply of water at a minimum pressure of 160 kPa.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

LL4 PROCEDURE

This test may be carried out at the available water temperature.

The procedure shall be as follows:

(a) Mount the device in its normal operating position.

(b) Connect pressure gauge to the upstream chamber.

(c) Purge the system of air and pressurize the device to at least 150 kPa.

(d) Within 10 s period—

  (i) increase the upstream pressure by 10 kPa, then;

  (ii) reduce the upstream pressure by 10 kPa below the original setting; and

  (iii) increase the upstream pressure to the original setting.

LL5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any discharge from the relief valve.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix LL.

APPENDIX MM

BACK-SIPHONAGE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

MM1 SCOPE

This Appendix sets out the method for determining the back-siphonage test on reduced pressure zone devices and reduced pressure detector assemblies with both non-return valves fouled.

MM2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

MM3 APPARATUS

The following apparatus is required:

(a) Test rig complying with Figure MM1.

(b) Coloured water at ambient room temperature.

(c) Vacuum pump.

(d) Vacuum gauge complying with Paragraph C3.4, Appendix C.

(e) Vacuum regulators.

(f) Isolating valves complying with Paragraph C1.6, Appendix C.

(g) Sight glass complying with Paragraph C1.5, Appendix C.

(h) Reservoir to contain water.

MM4 PROCEDURE

The procedure shall be as follows (see Figure MM1):

(a) Mount the device in the test rig.

(b) Position the reservoir of coloured water (10) so that the end of the sight glass (9) is immersed not less than 40 mm nor more than 60 mm in the water.

(c) Open isolating valves (4), (5) and (6) and close quick-acting device (8).

(d) Start the vacuum pump (1) and operate the vacuum regulator (7) to apply a vacuum of 85 kPa as evidenced on vacuum gauge (3).

(e) Apply this vacuum for 5 min.

(f) Observe and record the level of the meniscus of water in the sight glass.

(g) Switch off the vacuum pump (1) and return the upstream side of the pipework to atmospheric. (This can be achieved by operating the quick-acting device (8) to connect the pipework to atmosphere.)

(h) Repeat Step (d).

(i) Create a surge effect by operating a three-port valve (8) to isolate the vacuum line upstream, and reduce the vacuum downstream to 0 kPa.

(j) Repeat Step (i) 5 times at five 1 s intervals, observing and recording the level of the meniscus of the water in the sight glass.

(k) Switch off the vacuum pump (1) and return the rig to atmospheric.

(l) Foul all non-return valves in accordance with Paragraph C1.9, Appendix C.

(m) Repeat Steps (b) to (k) inclusive.

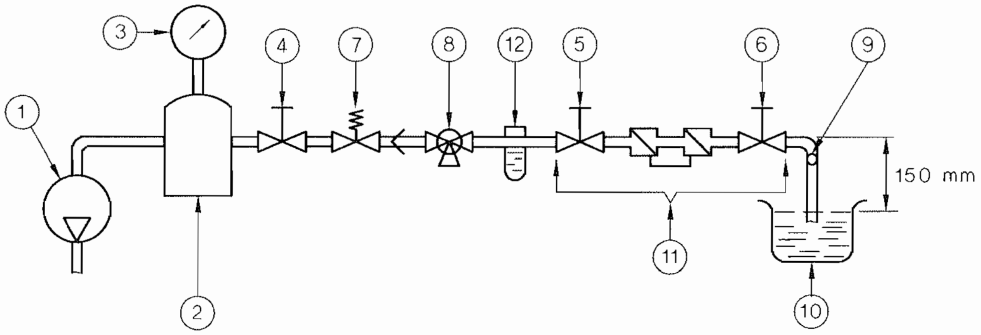
MM5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, type and size of device.

(b) The level of the meniscus of water in sight glass, above the level of the water in the reservoir in millimetres during Steps (f) and (j).

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix MM.



NOTE: All pipework and fittings between the vacuum tank and the test device have to be of the same nominal size as the test device.

FIGURE MM1 TYPICAL TEST RIG FOR BACK-SIPHONAGE TEST

APPENDIX NN

BACKPRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

(Normative)

NN1 SCOPE

This Appendix sets out the method for determining the backpressure test on reduced pressure zone devices and reduced pressure detector assemblies with either non-return valve fouled.

NN2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

NN3 APPARATUS

The following apparatus is required:

(a) Test rig complying with Figure NN1.

(b) Water supply at ambient room temperature and a minimum pressure of 100 kPa.

(c) Coloured water supply at ambient room temperature and a minimum pressure of 1400 kPa.

(d) Isolating valves complying with Paragraph C1.6, Appendix C.

(e) Sight glass complying with Paragraph C1.5, Appendix C.

(f) Vacuum gauge complying with Paragraph C3.4, Appendix C.

(g) Pressure gauge complying with Paragraph 3.4, Appendix C.

(h) Bleed tap.

NN4 PROCEDURE

The procedure shall be as follows:

(a) Foul the upstream non-return valve of the test device in accordance with Paragraph C1.9, Appendix C.

(b) Pressurize the primary water supply to 100 ±10 kPa.

(c) In sequence open isolating valves (6), (1) and (2).

(d) With water flowing from isolating valves (6) and (1), close, in sequence, isolating valves (6) and (2) to purge air from the system.

(e) Open isolating valve (5).

(f) Slowly pressurize the secondary water supply to 1400 +50, −0 kPa. As evidenced by the reading on pressure gauge (9), hold the pressure for 5 min +0.5, −0s. Record the reading.

(g) Reduce the pressure of the primary water supply to zero by opening bleed cock (10).

(h) Close bleed cock (10).

(i) Start the vacuum pump and reduce the upstream pressure to a vacuum of 85 kPa. Hold the vacuum for 5 min.

(j) Observe the gauge glass for the presence of coloured water.

(k) Stop the vacuum pump and de-pressurize the test rig.

(l) Remove the fouling wire from the upstream non-return valve.

(m) Foul the downstream non-return valve in accordance with Paragraph C1.9, Appendix C.

(n) Seal the vent port of the device under test.

(o) Repeat Steps (b) to (k) inclusive.

NN5 TEST REPORT

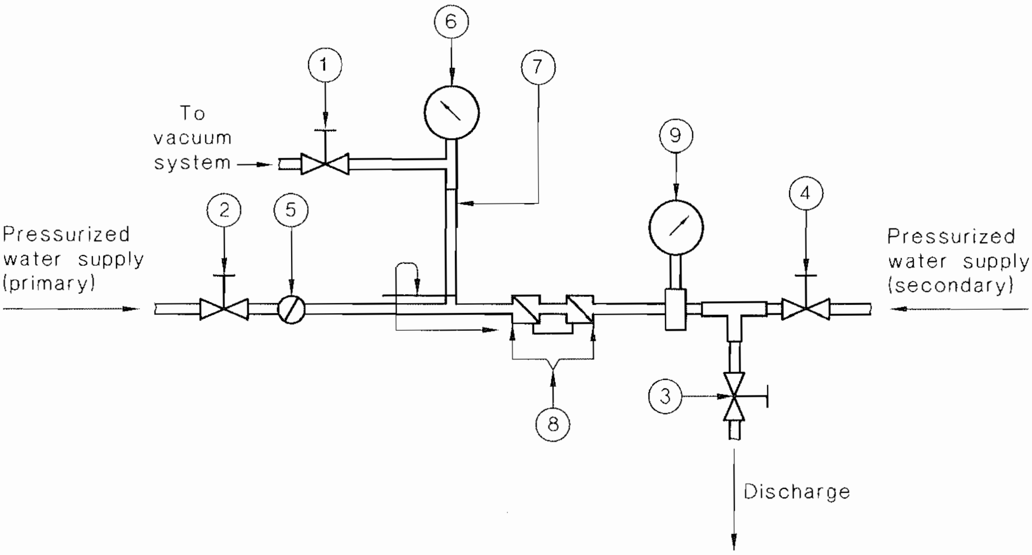
The following shall be reported:

(a) The manufacturer, model, type and size of device.

(b) The pressures in Step (f).

(c) The pressure or absence of coloured water in the sight glass, Step (j).

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix NN.


6
1
7
To vacuum system
9
4
2
5
Pressurized water supply (primary)
Pressurized water supply (secondary)
3
8
Discharge

NOTE: The distance from the device under test to the sight glass has to be 100 +5, −0 mm.

FIGURE NN1 TYPICAL TEST ASSEMBLY FOR BACKPRESSURE TEST—RPDZ AND RPDA

APPENDIX OO

ENDURANCE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPZA)

(Normative)

OO1 SCOPE

This Appendix sets out the method for testing the endurance of a reduced pressure zone device and a reduced pressure detector assembly.

NOTE: Appendix F may apply also to these devices.

OO2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

OO3 APPARATUS

Counting facility capable of producing the test flow rates and pressures with water at the available water temperature.

OO4 PROCEDURE

The procedure shall be as follows:

(a) Test for 50 000 cycles at a rate not exceeding 10 cycles per minute of alternating flow (through the device) of zero to the rated flow in accordance with Table 12.2, at ambient water temperature. At zero flow through the device during each cycle, subject the downstream non-return valve to a backpressure of 400 kPa. The backpressure is developed by pressurizing the downstream to the device and by draining the upstream of the device to atmospheric pressure. Maintain the backpressure for a minimum of 2 s during each cycle.

(b) At the conclusion of the prescribed number of cycles, retest the device for—

  (i) reverse pressure in accordance with Appendix G;

  (ii) downstream non-return valve closing pressure in accordance with Appendix U;

  (iii) intermediate chamber pressure in accordance with Appendix GG; and

  (iv) pressure differential at which the relief valve commences to open in accordance with Appendix KK.

OO5 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any leakage through the non-return valves or failure of the relief valve to operate.

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix OO.

APPENDIX PP

STICTION TEST—RESILIENT SEAT MATERIAL

(Normative)

PP1 SCOPE

This Appendix sets out the method for a stiction test for resilient seat materials subjected to constant water pressure at the maximum allowable operating temperature.

PP2 TEMPERATURE OF MEASUREMENT

The device shall be tested at a temperature in accordance with Table PP1.

PP3 PRINCIPLE

The device is installed in a test rig and subjected to hydrostatic pressure cycled at low and elevated water temperatures for specified periods of time.

PP4 APPLICATION

The test applies to cold water devices only. The test conditions are designed to reproduce the diurnal temperature variations and main pressures that may be experienced under Australian condition.

PP5 APPARATUS

The following apparatus is required:

(a) A supply of water to achieve the test pressure and temperature.

(b) Pressure gauge complying with Paragraph C3.4, Appendix C.

(c) Timing device complying with Paragraph C1.4, Appendix C.

(d) Thermostat.

(e) Vacuum tank.

(f) A sight glass complying with Paragraph C1.5, Appendix C.

(g) Reservoir of coloured water.

(h) Fouling wire complying with Paragraph C1.9, Appendix C.

TABLE PP1

TEST PRESSURES AND WATER TEMPERATURES FOR STICTION TEST

Sequence and duration of water temperature and days		
Sequence	**Water temperature, °C**	**Duration total 90 d**
1	≤40	21
2	MOT	21
3	≤60	21
4	MOT	21
5	≤60	6

NOTES:

1 For test pressures in kilopascals see Clause 3.3(a).

2 For water temperatures in degrees Centigrade see Clause 3.3(b).

3 If it is considered that these devices will be required for heated water applications, additional testing at ambient and the maximum operating temperatures will be required.

PP6 PROCEDURE

The procedure shall be as follows:

(a) Mount the device in its normal working position.

(b) Purge the device of air and apply hydrostatic pressure at the inlet. The appropriate test pressure and temperatures shall be applied and maintained for the specified periods as listed in Table PP1.

(c) Foul the non-return valve using a fouling wire in accordance with Paragraph C1.9, Appendix C.

(d) Precondition the valve to test temperature for at least 2 h and maintain this temperature for the duration of the test.

(e) Connect the inlet of the device to the vacuum tank.

(f) Connect the sight glass directly to the outlet of the device.

(g) Submerge the lower end of the sight glass in a reservoir of coloured water positioned below the device.

(h) Gradually apply a vacuum of 85 kPa below atmospheric pressure to the inlet of the device and observe any water rise in the sight glass.

NOTE: The crown of the meniscus in the sight tube should not rise more than 3 mm.

(i) Repeat the gradual application of vacuum at least three times and observe any water rise in the sight glass.

(j) Repeat Steps (d) to (i) for each of the five stages of the sequence.

(k) Section or dismantle the device to expose the ventilation valve sealing arrangement and examine closely using appropriate magnification and light sources.

PP7 TEST REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of device.

(b) Any back-siphonage from the device as indicated by the appearance of coloured water in the sight glass.

(c) Any evidence of stiction or adhesion of the sealing elements. Any damage to the sealing elements. The sealing elements of the ventilation device at the completion of the test shall show no visual evidence of permanent damage such as splitting, tearing, pitting, peeling, delamination, gouging or other mechanical damage to the sealing faces from stiction or adhesion.

(d) Reference to this method, i.e., AS/NZS 2845.1, Appendix PP.

APPENDIX QQ

AIR PORT ENTRY SEALING TEST—SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)

(Normative)

QQ1 SCOPE

This Appendix sets out the method for determining whether the air port entry closes and remains closed whenever there is a flow through the non-return valve.

QQ2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

QQ3 APPARATUS

The following apparatus is required:

(a) A test rig complying with Figure QQ1.

(b) Supply of water variable in flow at ambient temperature.

QQ4 PROCEDURE

The procedure shall be as follows:

(a) Mount the device (4) in the test rig (see Figure QQ1), in accordance with the manufacturer's instructions.

(b) Remove the air port shield.

(c) Open isolating valve (3).

(d) Slowly open isolating valve (2) until a flow rate of 1.5 +0, −5 L/m is achieved as registered in flow meter (5).

(e) Maintain the flow condition for not less than 30 s, then observe the air port area and record the presence or absence of any leakage.

(f) Slowly increase the flow rate to 25%, 50% and 100% of the flow rate in Table 14.1, and repeat the procedure in Step (e) for each flow rate.

QQ5 REPORT

The following procedure shall be reported:

(a) The manufacturer, model, type and size of the device.

(b) The presence or absence of any leakage in Step (e).

(c) Reference to this test method, i.e., AS/NZS 2845.1, Appendix QQ.

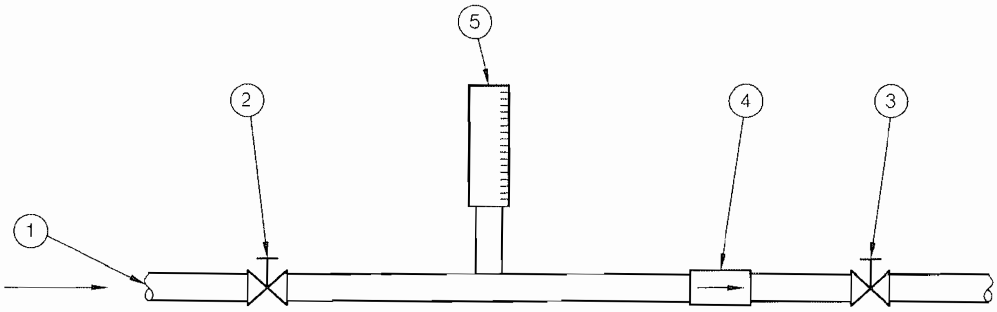


FIGURE QQ1 ASSEMBLY FOR AIR PORT SEALING TEST—SPVB

APPENDIX RR

BACK-SIPHONAGE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

(Normative)

RR1 SCOPE

This Appendix sets out the method for determining the back-siphonage performance of dual check valve with atmospheric port.

RR2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

RR3 PRINCIPLE

The device is installed in a test rig and subjected to airflow at various pressures.

RR4 APPARATUS

The following apparatus is required:

(a) Test rig complying with Figure RR1.

(b) A source of air variable in pressure.

(c) Pressure gauges complying with Paragraph C3.4, Appendix C.

RR5 PROCEDURE

This test is carried out with air to simulate a backflow of CO_2.

The procedure shall be as follows:

(a) Remove or render inoperative the downstream check devices.

(b) Install the test device (3) in the test rig.

(c) Raise the pressure at the inlet (4) to 70 ±10 kPa as registered.

(d) On gauge (2) raise the pressure at the outlet (5) until air discharges from the vent.

NOTE: This can be evidenced by connecting a pipe to the vent outlet and immersing the open end in a container of water (6).

(e) Observe and record the pressures on gauges (1) and (2).

(f) Repeat Steps (d) and (e) with pressures at the outlet of 100 ±10 kPa and 350 kPa, or the manufacturers rated working pressure whichever is the higher pressure.

RR6 REPORT

The following shall be reported:

(a) The manufacturer, model number of the device under test.

(b) The pressures recorded in (e).

(c) Reference to this test method i.e., AS/NZS 2845.1, Appendix RR.

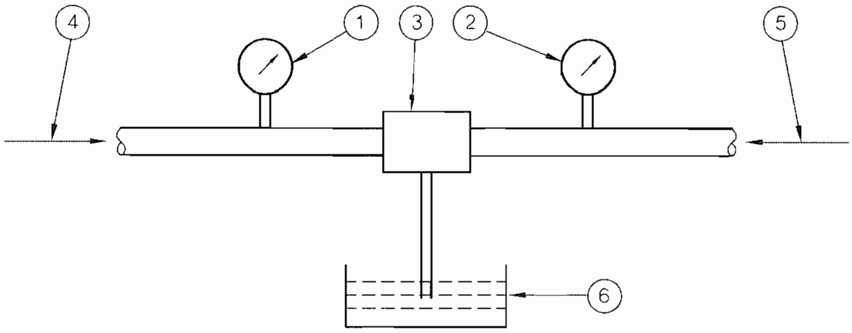


FIGURE RR1 ASSEMBLY FOR BACK-SIPHONAGE TEST—BDDC

APPENDIX SS

ENDURANCE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)

(Normative)

SS1 SCOPE

This Appendix sets out the method for endurance testing beverage dispenser dual check valve with atmospheric port.

SS2 TEMPERATURE OF MEASUREMENT

Devices shall be tested at a temperature not exceeding 40°C.

SS3 APPARATUS

A counting facility capable of producing the test flow rates and pressures with water at the available water temperature.

SS4 PROCEDURE

The procedure shall be as follows:

(a) Test for 50 000 cycles at a rate not exceeding 10 cycles per minutes, of alternating flow through the device of zero to the rated flow in accordance with Table 15.1 at ambient water temperature. At zero flow through the device during each cycle, subject the downstream non-return valve to a backpressure of 400 kPa. The backpressure is developed by pressurizing the downstream of the device and by draining the upstream of the device to atmospheric pressure. Maintain the backpressure for a minimum of 2 s during each cycle.

(b) At the conclusion of the prescribed number of cycles, retest the device for compliance with Clauses 3.7.4 and 15.5.2 (downstream non-return valve only), and 15.5.3, 15.5.4 and 15.5.5.

SS5 REPORT

The following shall be reported:

(a) The manufacturer, model, size and type of the device.

(b) Any leakage through the non-return valve.

(c) Any back-siphonage to the upstream side of the device.

(d) Reference to this test method, i.e., AS/NZS 2845.1, Appendix SS.

APPENDIX TT

REQUIREMENTS SPECIFIC TO PLASTICS MATERIALS FOR DEVICE BODIES

(Normative)

TT1 SCOPE

This Appendix sets out the requirements for plastics-bodied devices.

TT2 COMPOSITION

TT2.1 General

Plastic-bodied devices shall be manufactured from compounds that meet the requirements of Paragraphs TT2.2, TT2.3, TT2.4, TT2.5 and TT2.6 as appropriate.

TT2.2 Reprocessable material

Only clean reprocessable material generated from a manufacturer's own production of fittings to this specification may be used, and it shall be derived from the same resin as used for the relevant production.

TT2.3 Plastics-moulded material test

The long-term behaviour of the material of the device body shall be verified in a type test on an injection-moulded pipe specimen of the same material with an outside diameter of not less than 50 mm. The wall thickness of the specimen shall be not less than SDR21 and not more than SDR9. The free length of the specimen between the end connections shall be not less than three times the outside diameter.

When two pipe specimens are tested in accordance with ISO 1167, both specimens shall meet the test requirements given in Table TT1 without leaking or fracturing.

For materials not given in Table TT1, the test conditions used shall demonstrate compliance with ISO 9080, or shall be equivalent or better, for the evaluation of long-term performance of the material.

TABLE TT1

TEST CONDITIONS FOR PLASTICS-MOULDED MATERIALS

Material	Temperature °C	Induced stress MPa	Minimum test duration h
ABS	70	4.0	1 000
PE 80	80	4.0	1 000
PE 100	80	5.0	1 000
POM (homopolymer)	60	10.0	1 000
POM (copolymer)	95	6.0	400
PPH (homopolymer)	95	3.5	1 000
PPB (block copolymer)	95	2.6	1 000
PPR (random copolymer)	95	3.5	1 000
PVC-U	60	10 0	1 000
NP (Reinforced polyamide)	80	10 0	250

TT2.4 Plastics-bodied device test

Plastics-bodied devices shall be type-tested for resistance to internal pressure in accordance with ISO 1167. The device body shall be tested under the conditions specified in Table TT2. Special sealing plugs connected to one another by a rod allowing some longitudinal movement of the ends may be used or the plug may be held in place by the nut used on a compression fitting assembly.

No leakage or bursting of the device body shall occur within the minimum test period. If leakage occurs at the sealing plugs, the test is not valid and shall be repeated using another test specimen.

For materials that are not listed in Table TT2 test conditions shall be established, in accordance with ISO 9080, and are at least equivalent to the conditions for the materials listed in Table TT2 for the evaluation of the long-term performance of the material.

TABLE TT2

TEST CONDITIONS—FITTING BODY

Material	Temperature °C	Test duration h	Test pressure MPa
ABS	20 70	1 1 000	3.1 PN 0.5 PN
PE 80 PE 100	80 80	1 000 1 000	0.6 PN 0.6 PN
POM (homopolymer)	20 60	1 1 000	6.3 PN 1.5 PN
POM (copolymer)	20 60	1 1 000	5.0 PN 0.95 PN
PPH (homopolymer)	20 95	1 1 000	3.3 PN 0.55 PN
PPB (block copolymer)	20 95	1 1 000	2.5 PN 0.4 PN
PPR (random copolymer)	20 95	1 1 000	2.5 PN 0.55 PN
PVC-U	20 20	1 1 000	4.2 PN 3.2 PN
NP (Reinforced polyamide)	20 20	1 250	4.2 PN 3.2 PN

TT2.5 Opacity test

Plastics-bodied devices (other than black) shall be type-tested in accordance with ISO 7686. The amount of light transmitted through the fitting wall shall be less than or equal to 0.2%.

TT2.6 UV resistance

When tested in accordance with ISO 4892-3 for artificial weathering Method A, plastics-bodied devices that are designed to be exposed to daylight when installed shall not crack, craze or exhibit signs of any defect when visually inspected.

TT3 Freedom from defects

The surfaces of plastic components shall be free from grooves, pinholes, blisters, heat marks and other imperfections that could affect the performance or function of the fitting in service.

TT4 THREADED END CONNECTIONS ON DEVICES

Threads on device ends shall be right hand Whitworth form and shall comply with AS ISO 7.1 or AS 1722.2, as appropriate, and comply with Paragraph TT7. Other threads may be used provided that a suitable adaptor is supplied with each threaded connection making it comply with ISO 7.1 or AS 1722.2.

TT5 FLANGED ENDS ON DEVICES

Flanges that are required to connect to existing systems or for specific applications shall be constructed such that they may be attached to flanges complying with AS/NZS 4331, AS 2129 or AS 4087, and comply with Paragraph TT7.

Flanges shall be at right angles to and concentric with the axis of the device.

TT6 DEVICES INTENDED FOR CONNECTION TO PIPE SYSTEMS

Devices with end connections intended to join polyethylene pipe systems by mechanical jointing shall comply with AS/NZS 4129. Devices with end connections intended to join to pipe systems made from other materials (e.g. copper) shall comply with the relevant dimensional and performance requirements of the appropriate Australian, New Zealand or Joint Australian/New Zealand Standard for the other pipe system. Where there is a variation in criteria between that Standard and this Standard, the minimum criteria shall apply. Where there are no criteria given for a particular requirement in either Standard, then that requirement shall be deemed not to apply for the purposes of this Standard.

TT7 PERFORMANCE REQUIREMENTS FOR JOINTS

TT7.1 General

Joints made with plastics-bodied devices shall be assembled in accordance with the manufacturer's instructions and tested without external reinforcement.

TT7.2 Hydrostatic pressure test for assembled joints

A test assembly comprising at least one device with jointed pipes and/or fittings shall be tested in accordance with ISO 1167 at each of the test conditions specified in Paragraph TT3.

During the test period, the joints, device, pipes or fittings shall not leak or develop fractures, cracks or other failures within the joint, device or in the pipe or fitting within a distance DN from the joint, where DN corresponds to the nominal size of the pipe used in the assembly.

TABLE TT3

PRESSURE TEST PARAMETERS

Device material	Temperature °C	Test duration h	Induced stress MPa
PE 80, PE 100	20	1 000	1.5 PN
	40	1 000	1.1 PN
PPB, PPR	20	1 000	1.2 PN
	40	1 000	0.8 PN
PVC-U, PPH, POM, ABS, NP	20	1 000	1.5 PN
	40	1 000	1.1 PN

TT7.3 Liquid infiltration test

The assembled joints shall be tested in accordance with the method of ISO 3459, with the exception that there shall be no limit on the device diameter/size. No leakage shall occur during the application of either of the two test pressures.

TT7.4 Leaktightness under pressure when subjected to bending

An assembled joint shall be tested in accordance with the method of ISO 3503 at an internal hydraulic pressure equal to 1.8 × PN of the device. No leakage shall occur during the test period.

NOTES

NOTES

Standards Australia
Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

Standards New Zealand
The first national Standards organization was created in New Zealand in 1932. The Standards Council of New Zealand is the national authority responsible for the production of Standards. Standards New Zealand is the trading arm of the Standards Council established under the Standards Act 1988.

Australian/New Zealand Standards
Under a Memorandum of Understanding between Standards Australia and Standards New Zealand, Australian/New Zealand Standards are prepared by committees of experts from industry, governments, consumers and other sectors. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian/New Zealand Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

International Involvement
Standards Australia and Standards New Zealand are responsible for ensuring that the Australian and New Zealand viewpoints are considered in the formulation of international Standards and that the latest international experience is incorporated in national and Joint Standards. This role is vital in assisting local industry to compete in international markets. Both organizations are the national members of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission).

Visit our web sites

www.standards.org.au
www.standards.com.au
www.standards.co.nz

STANDARDS
NEW ZEALAND
PAEREWA AOTEAROA